

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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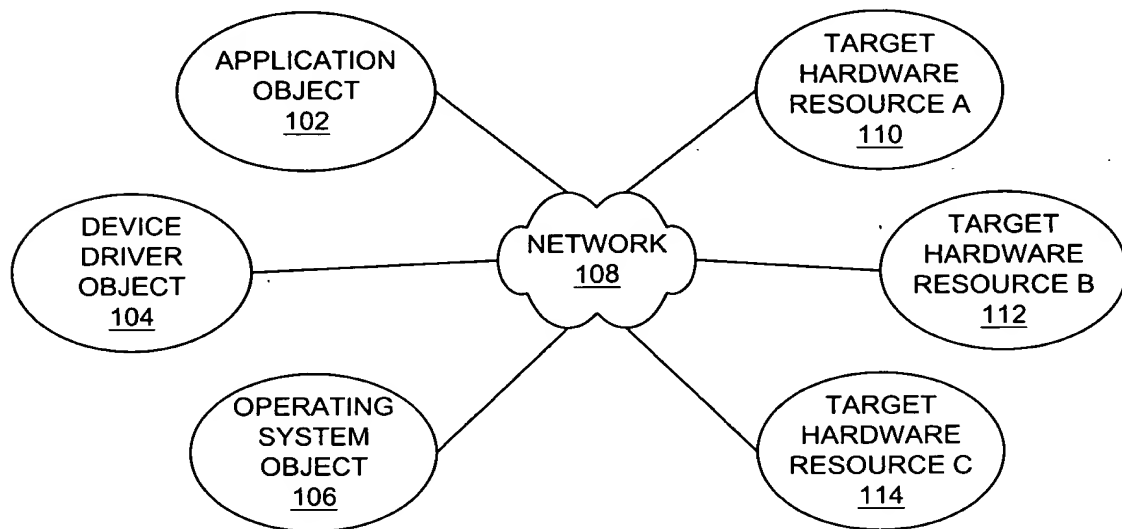


FIG. 1
(PRIOR ART)

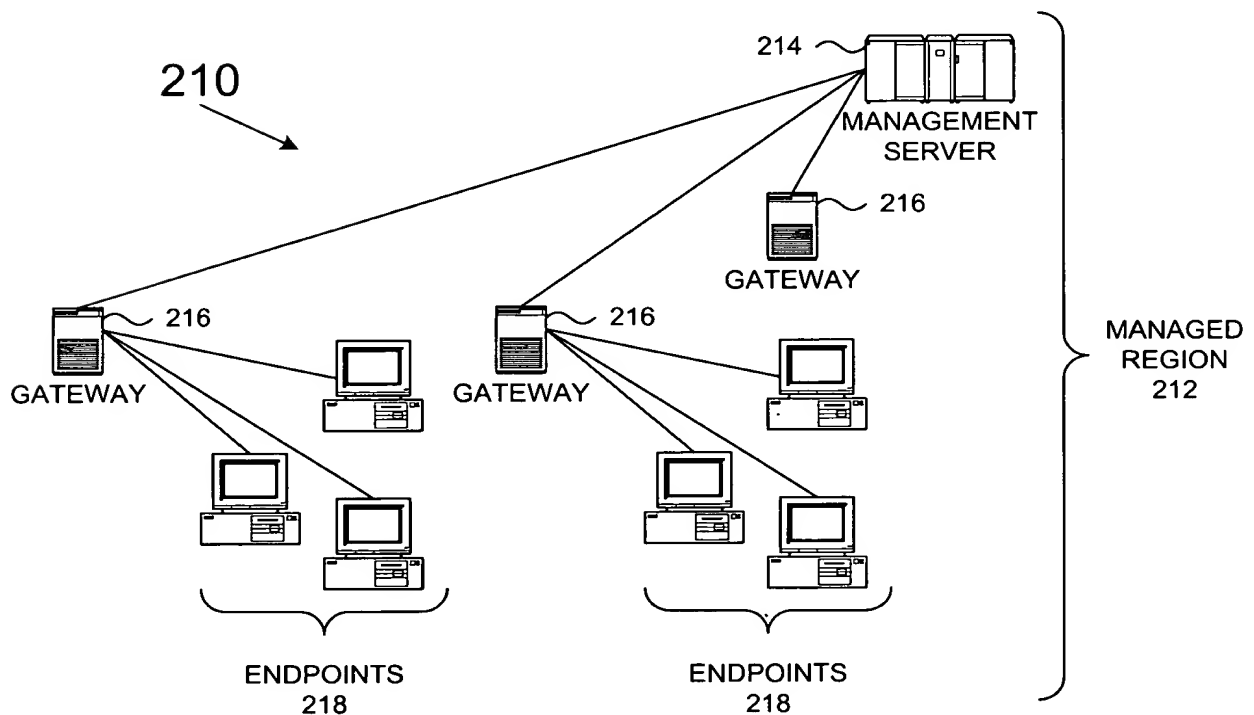


FIG. 2A

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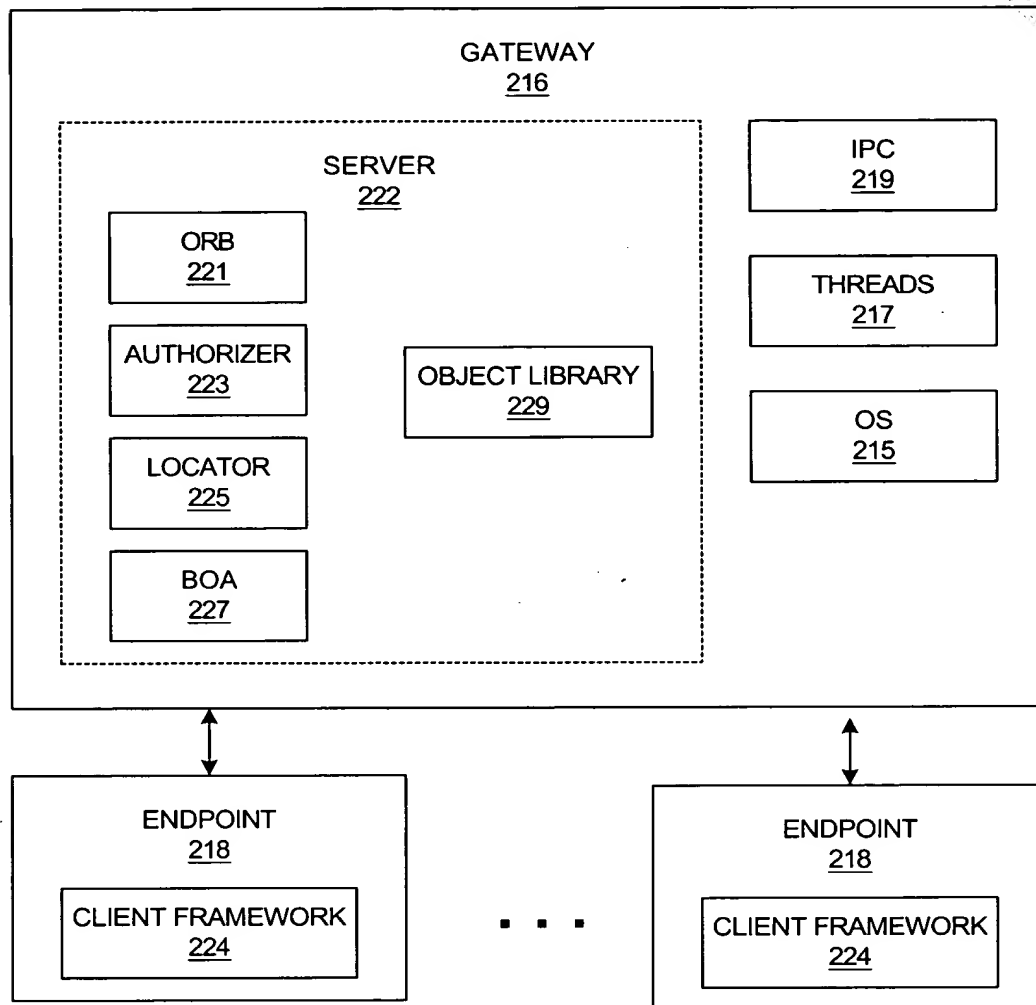


FIG. 2B

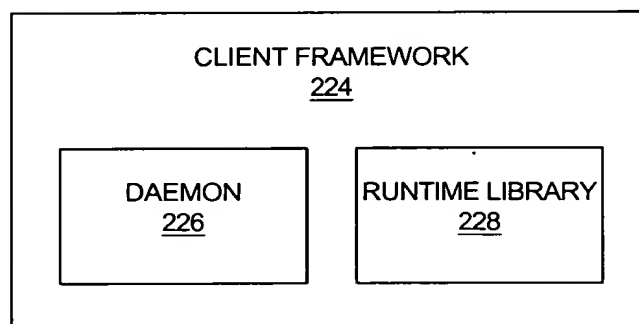


FIG. 2C

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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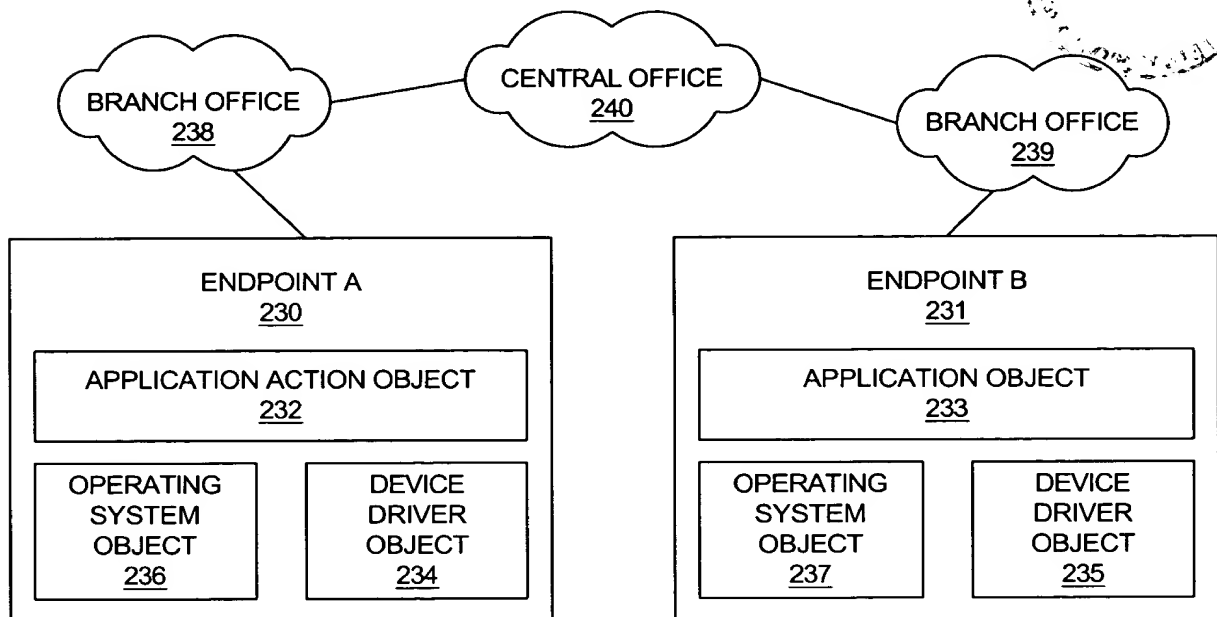


FIG. 2D

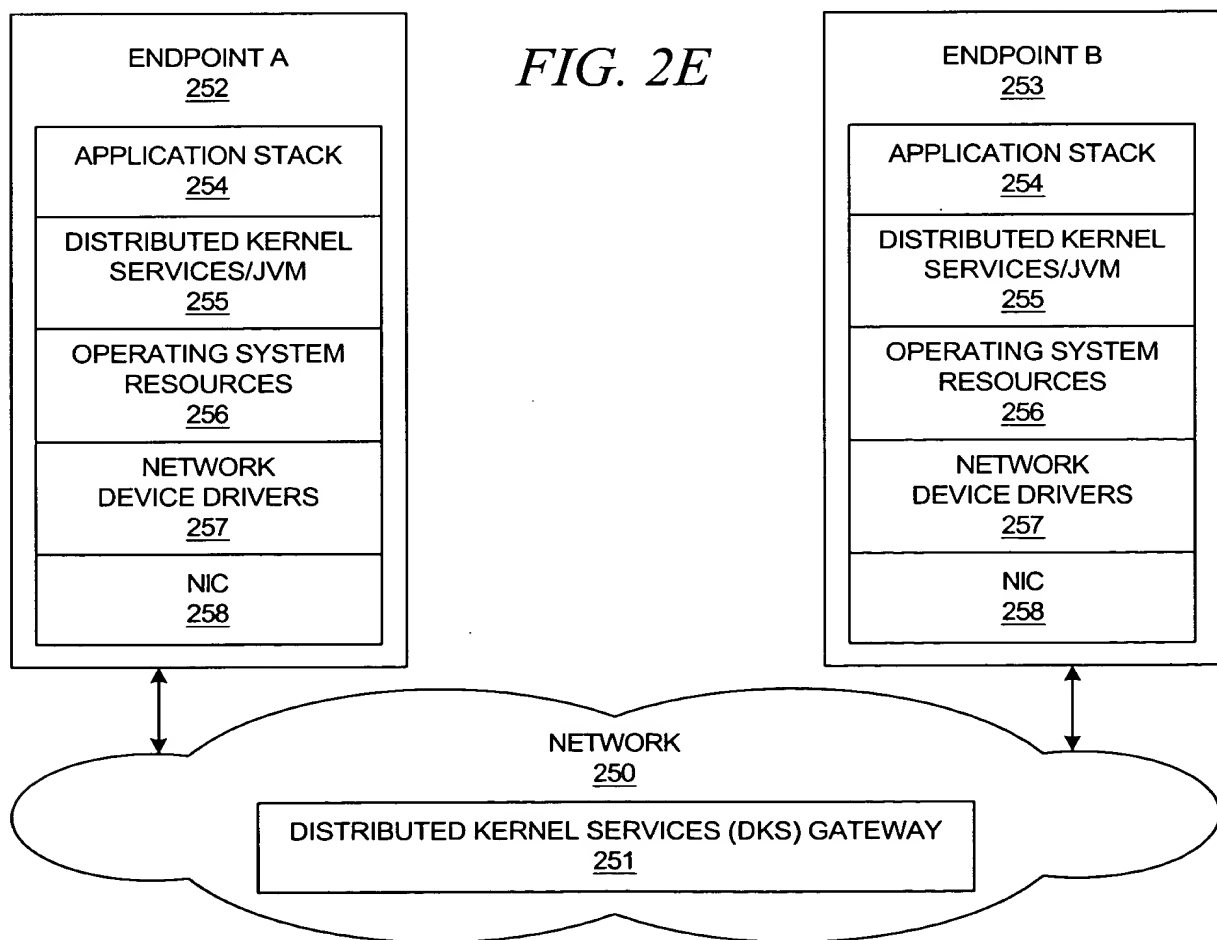


FIG. 2E

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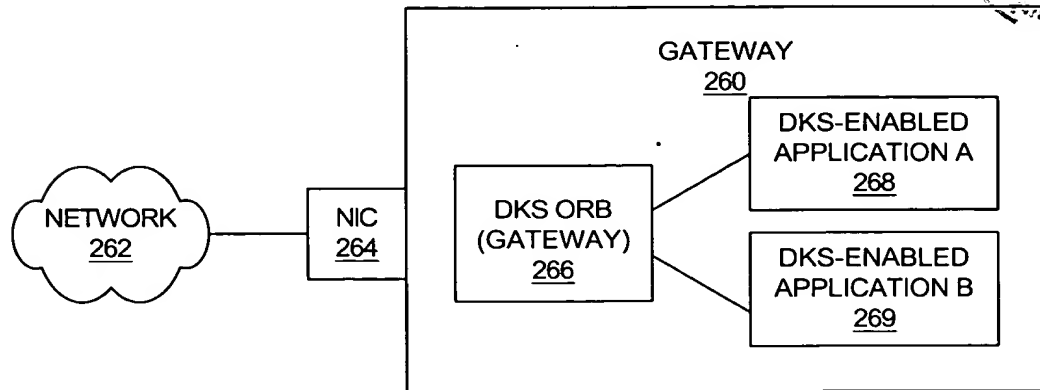


FIG. 2F

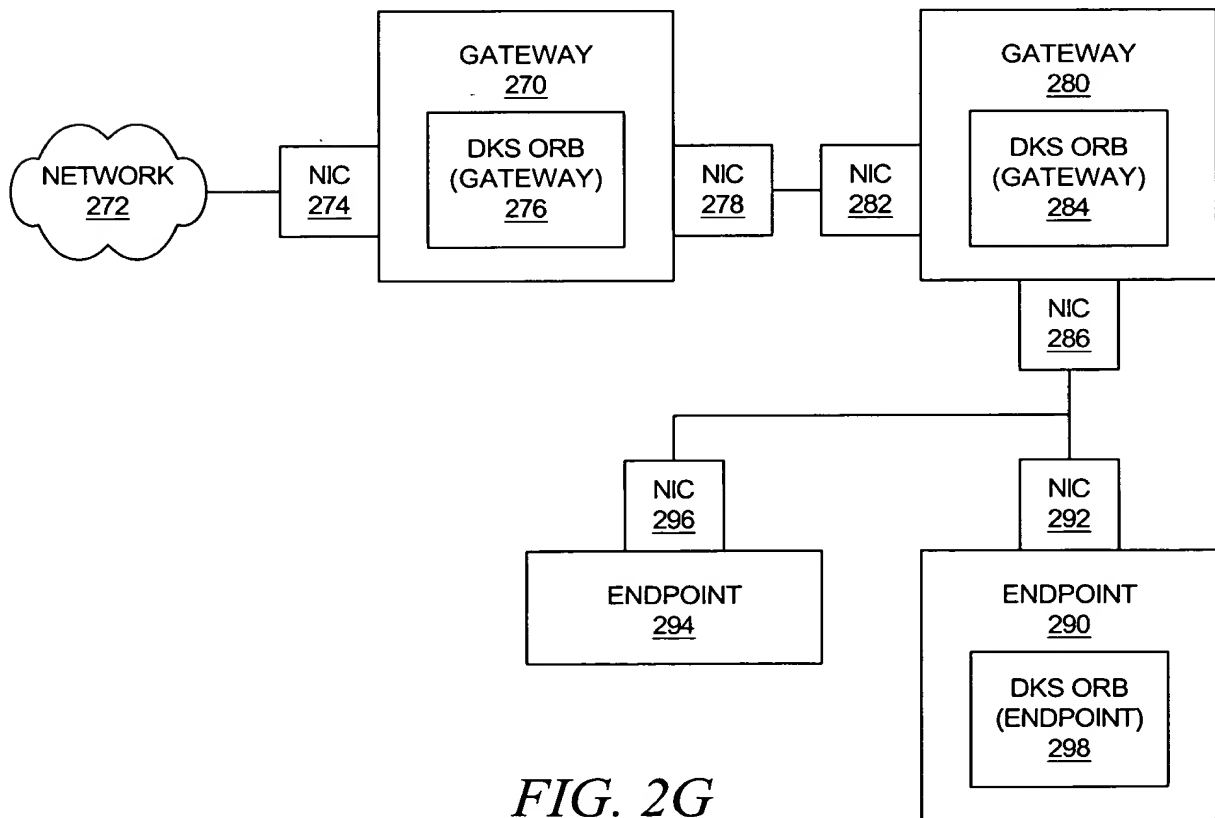


FIG. 2G

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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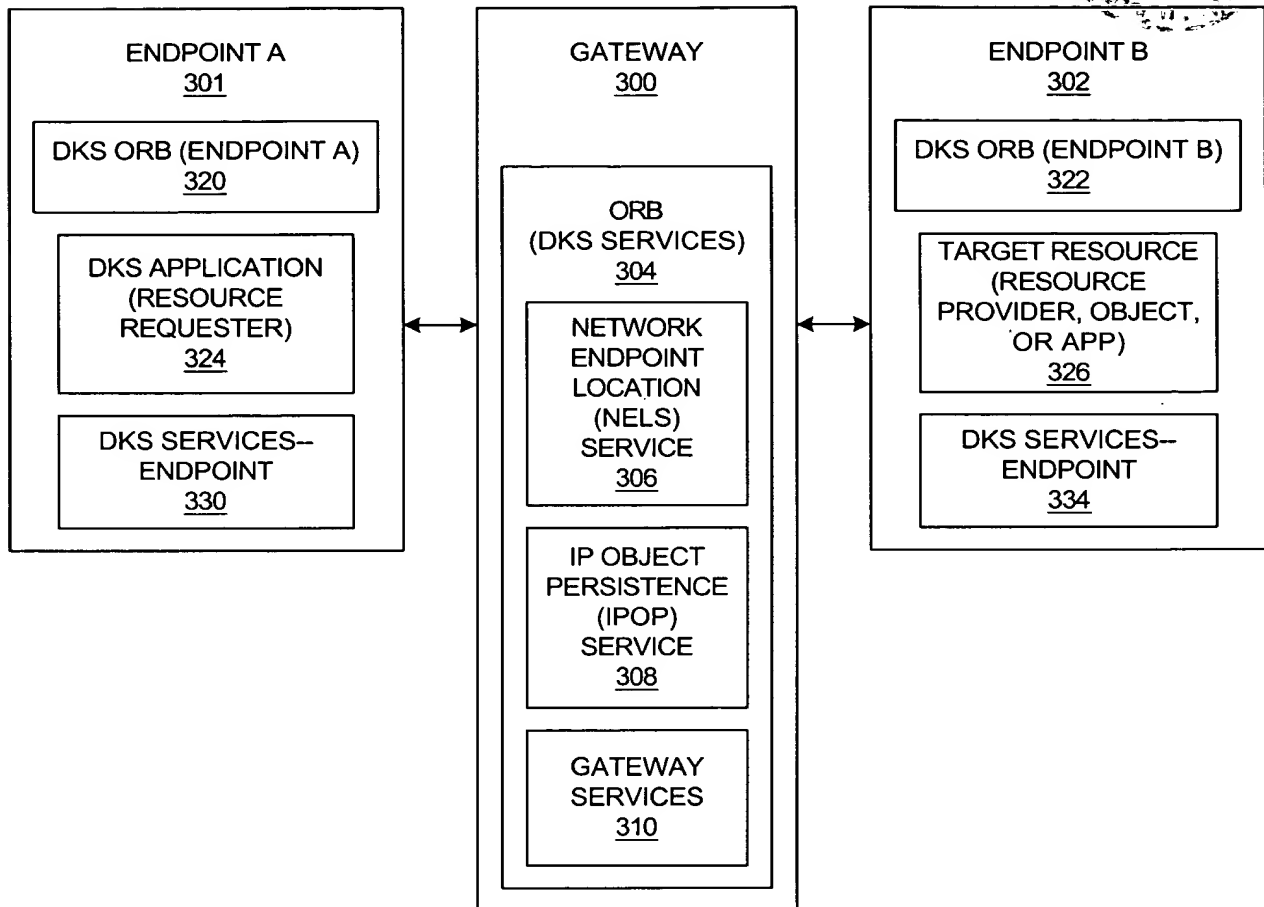


FIG. 3

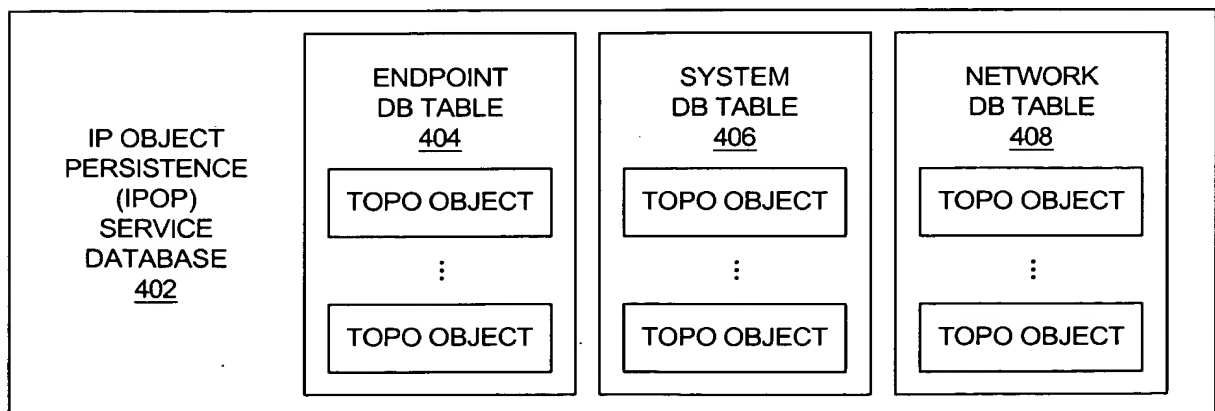


FIG. 4

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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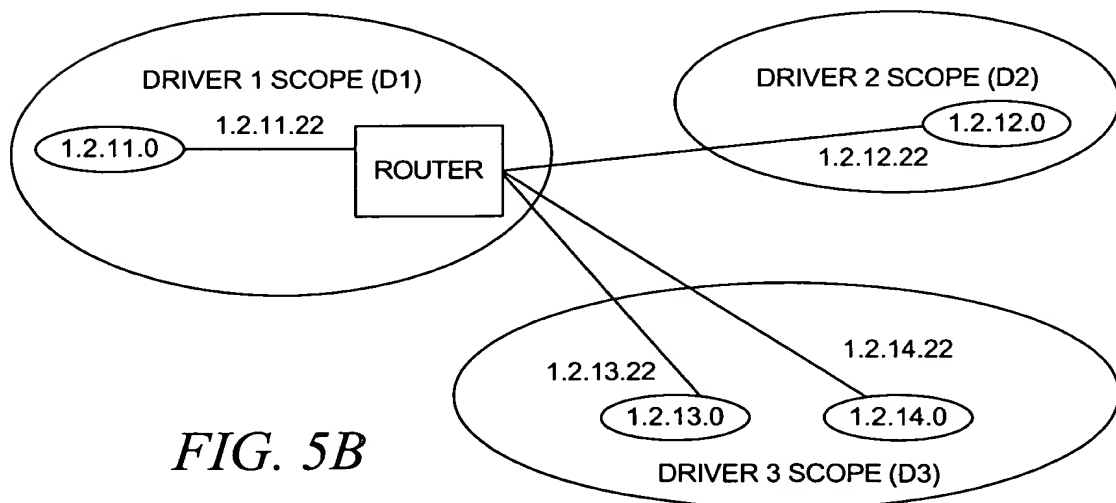
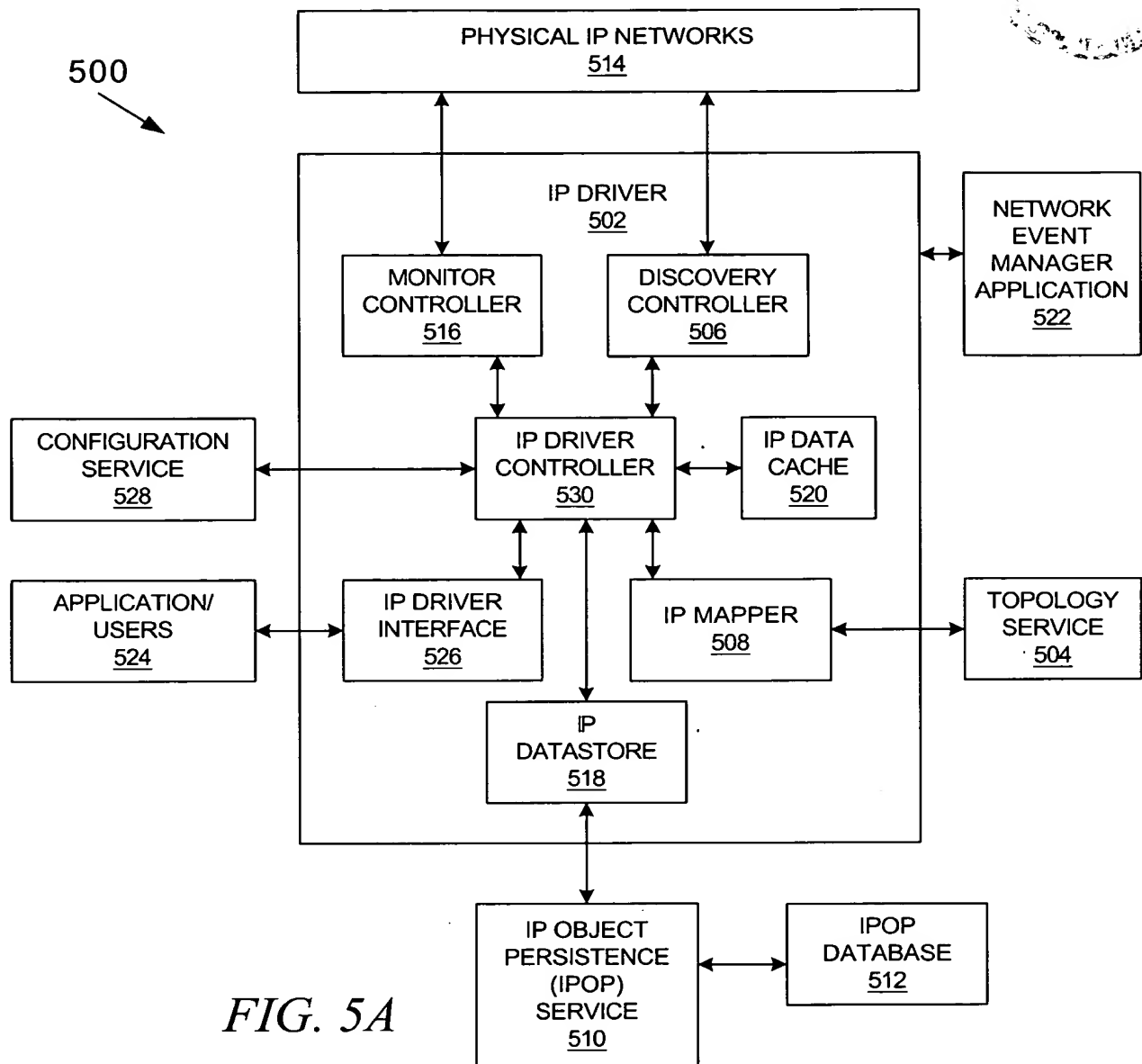


FIG. 5B

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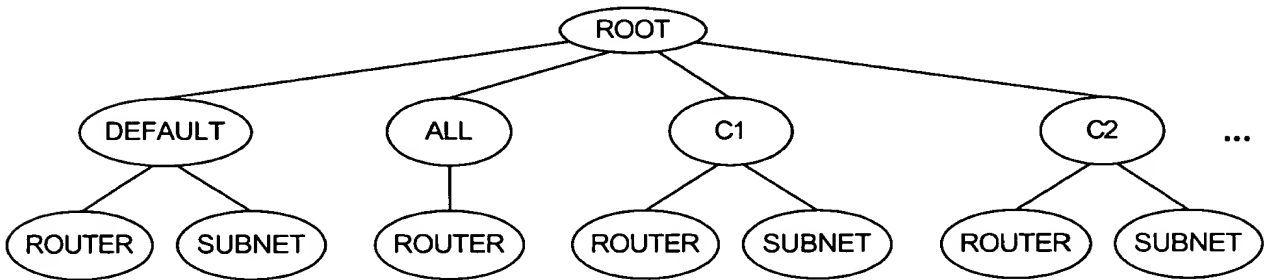


FIG. 5C

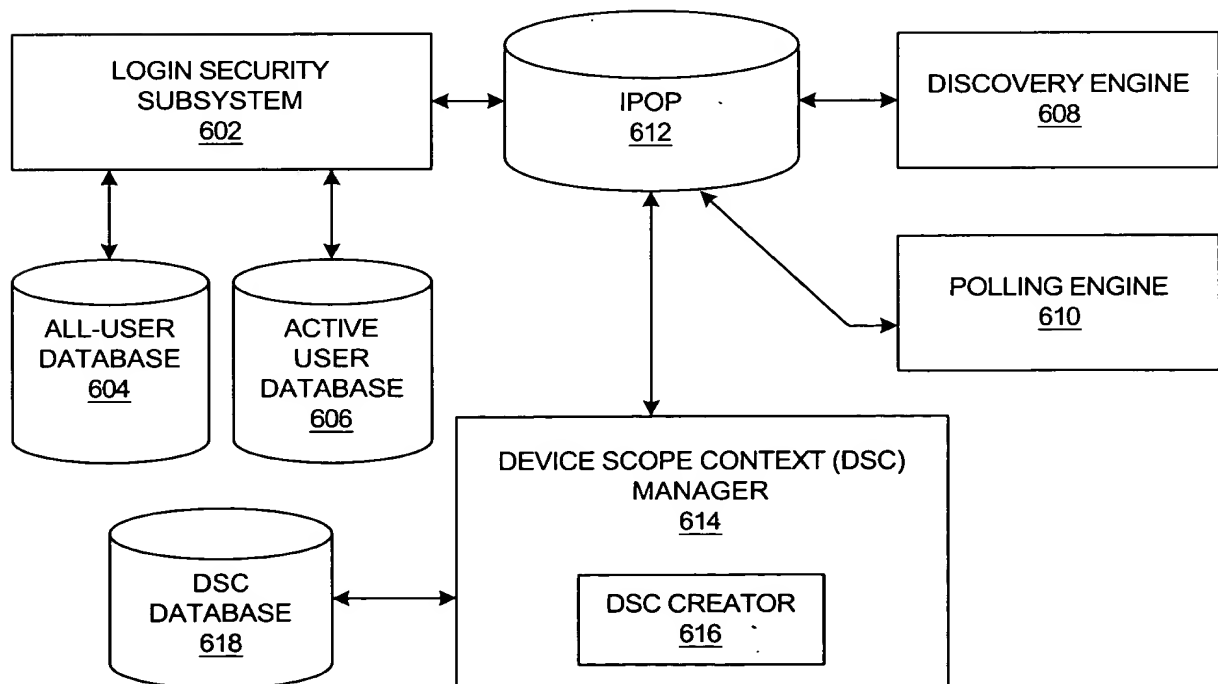


FIG. 6

Method and system for presentation and specification of distributed multi-customer,
configuration management within a network management framework

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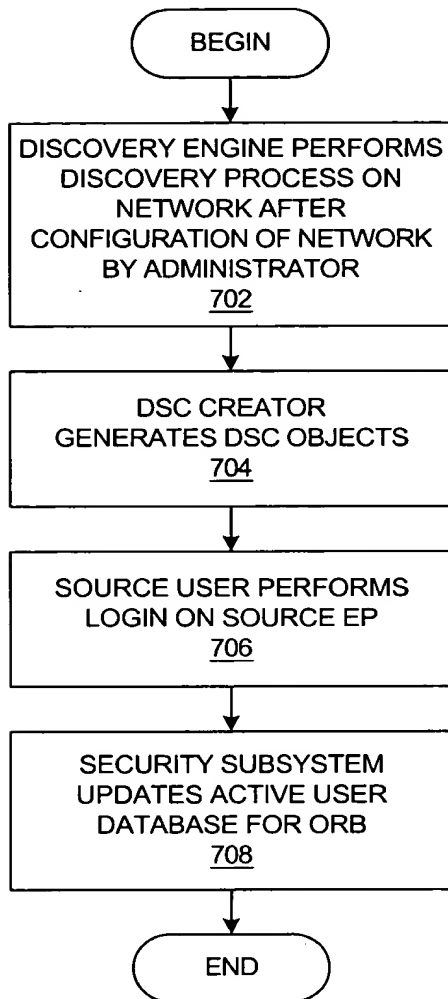


FIG. 7A

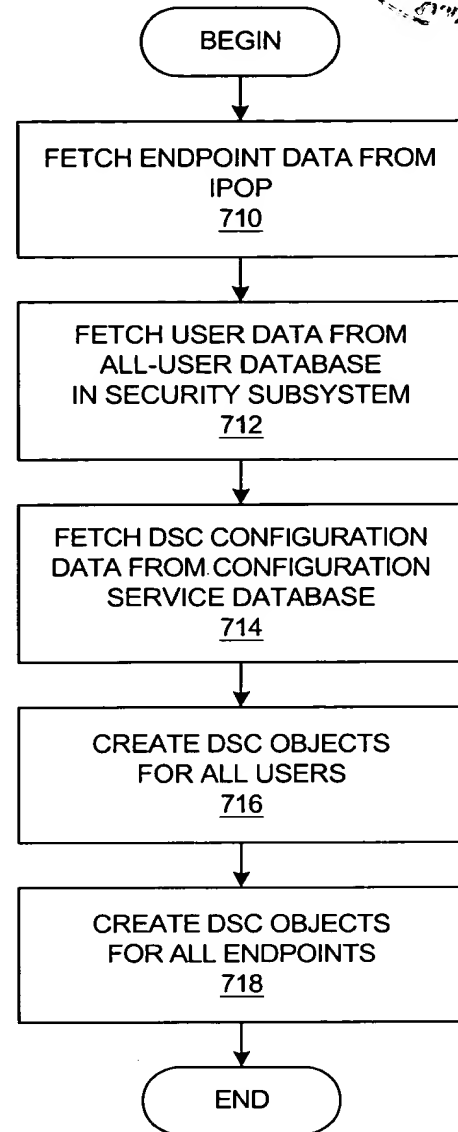


FIG. 7B

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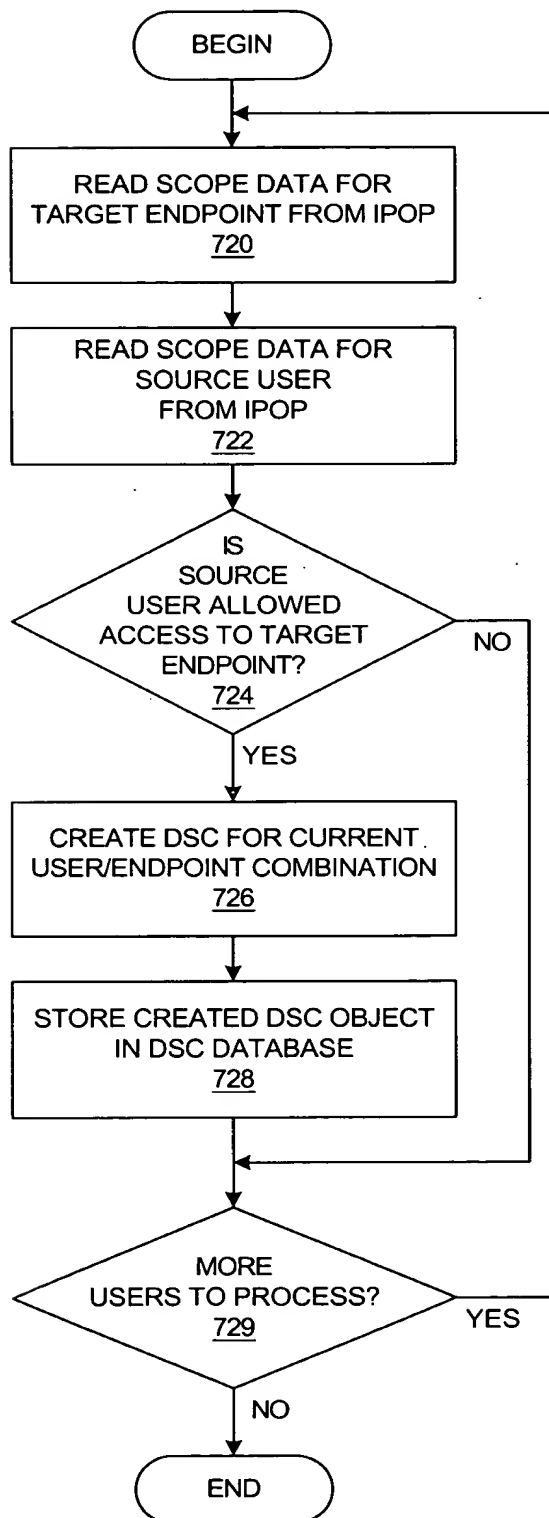


FIG. 7C

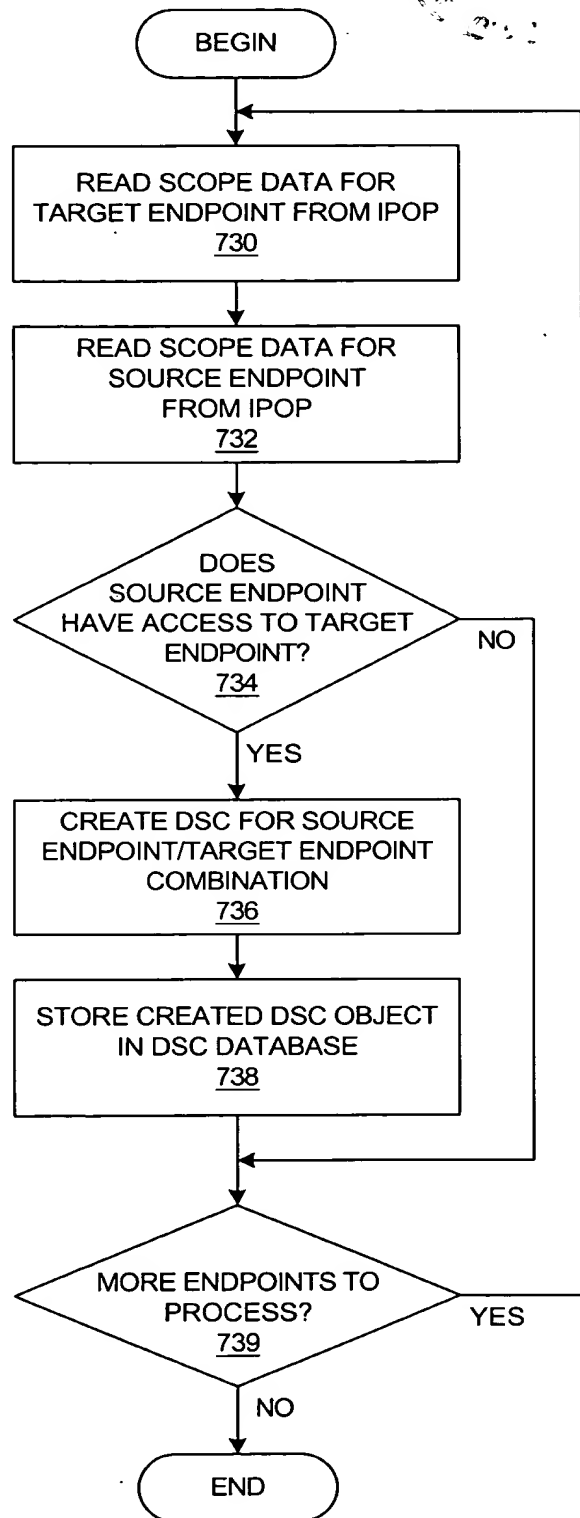


FIG. 7D

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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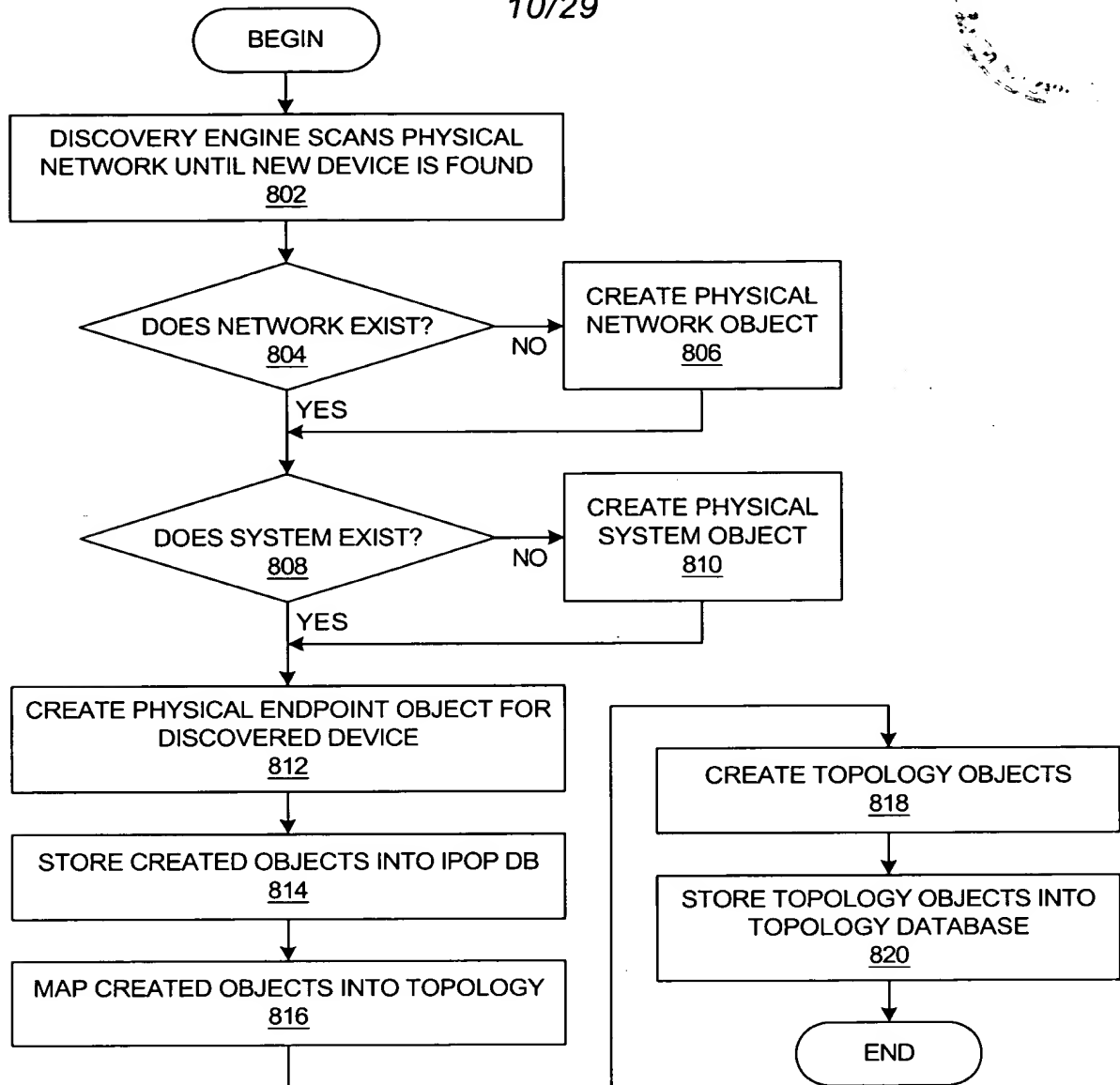


FIG. 8A

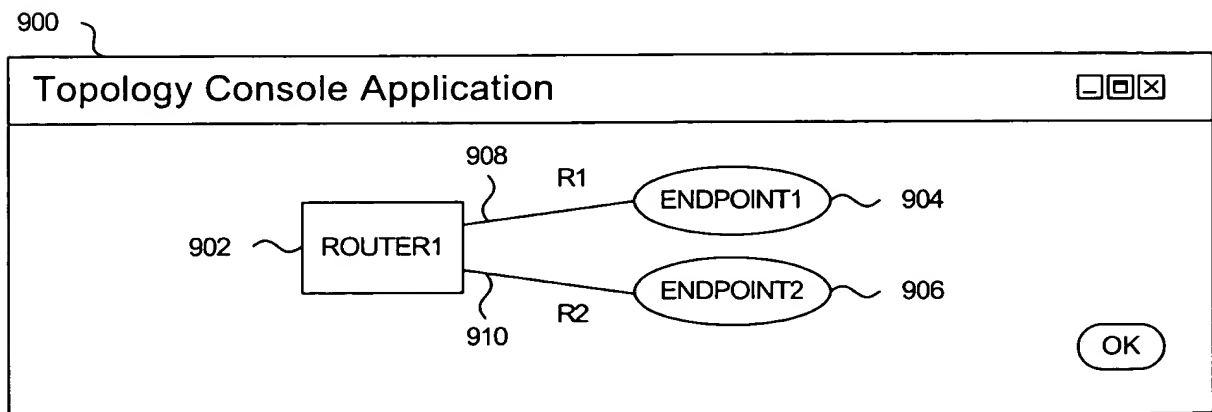


FIG. 9A

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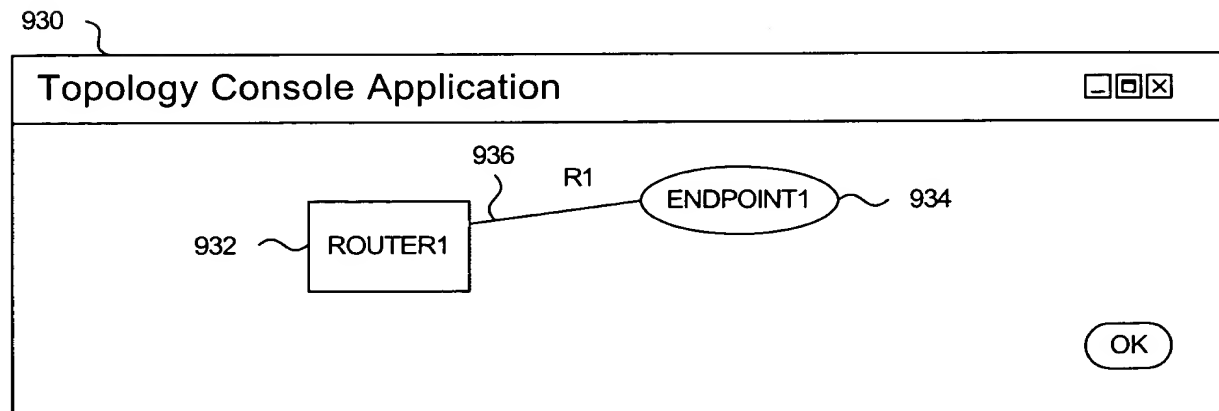
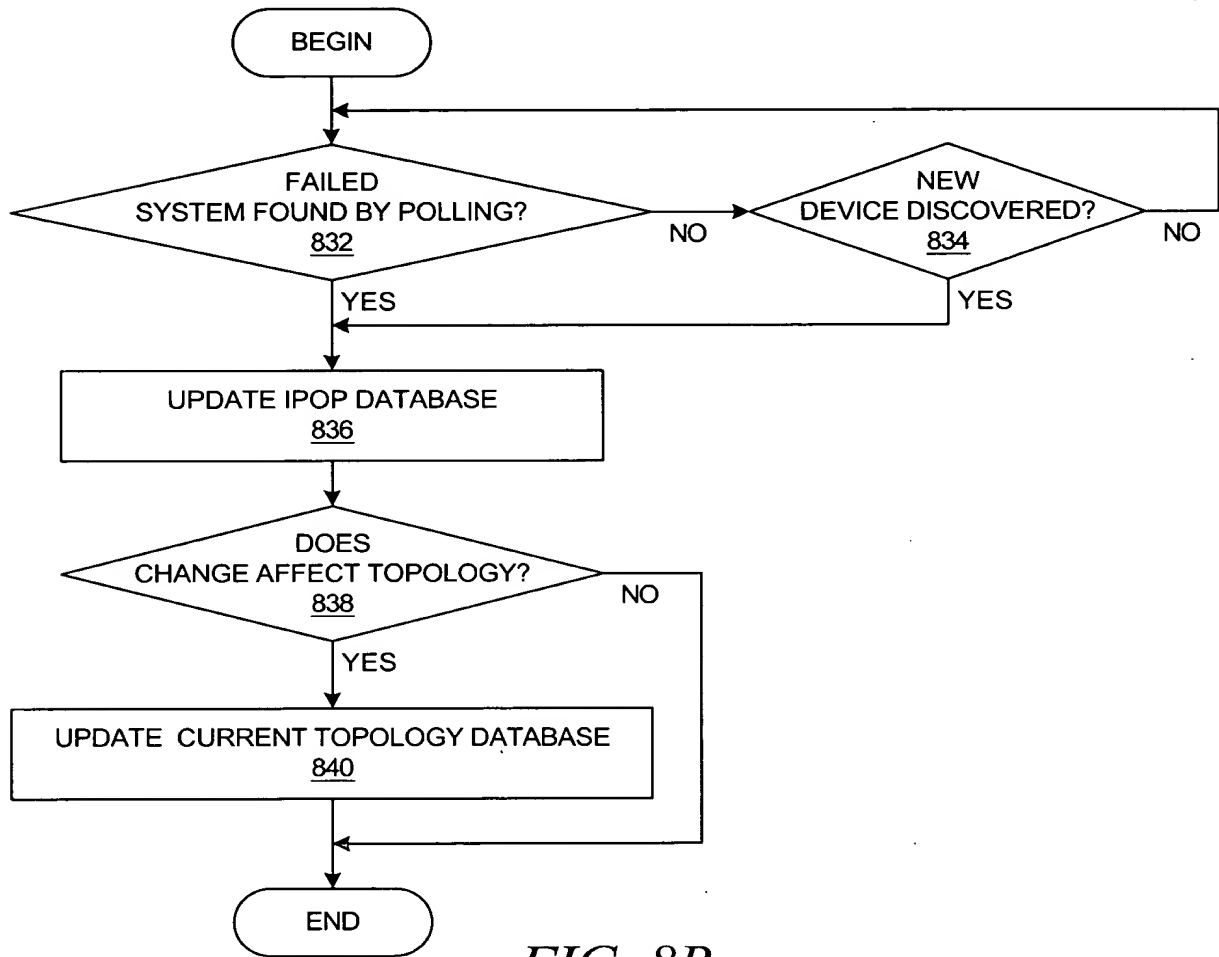


FIG. 9B

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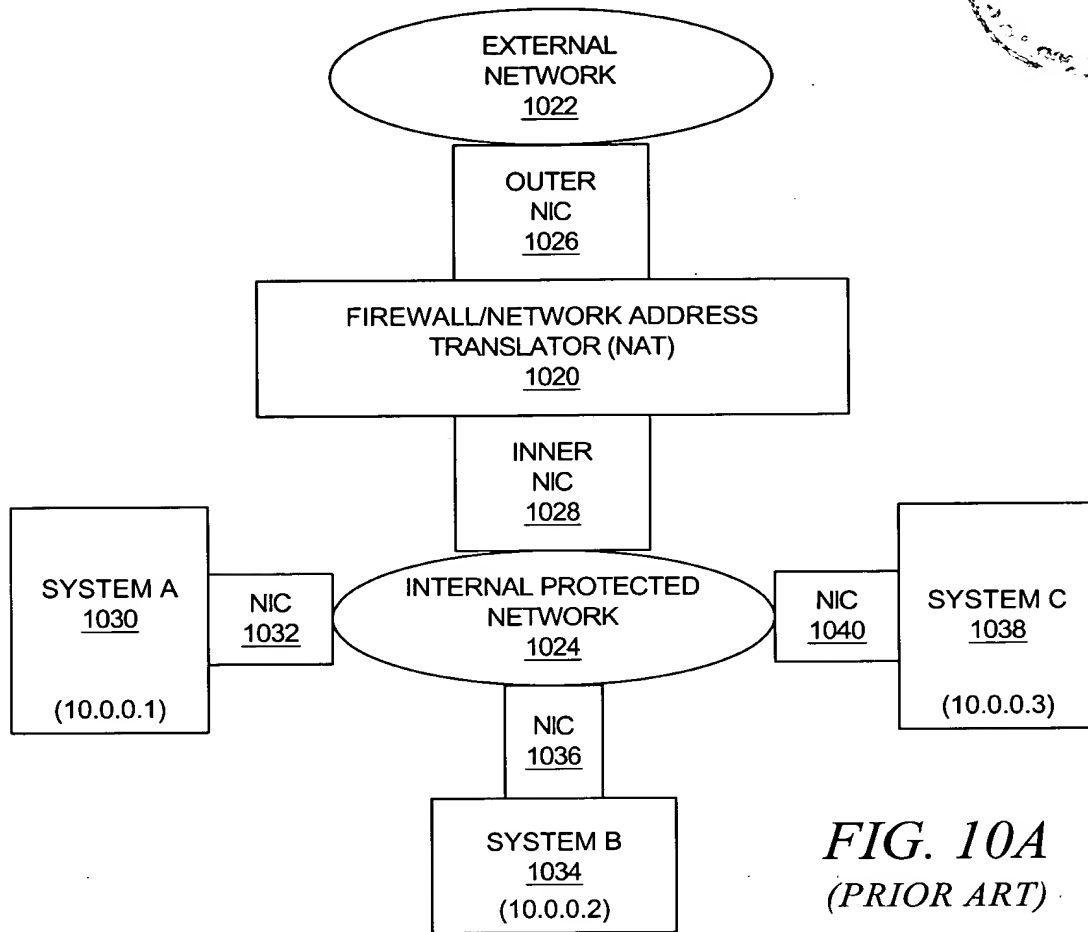


FIG. 10A
(PRIOR ART)

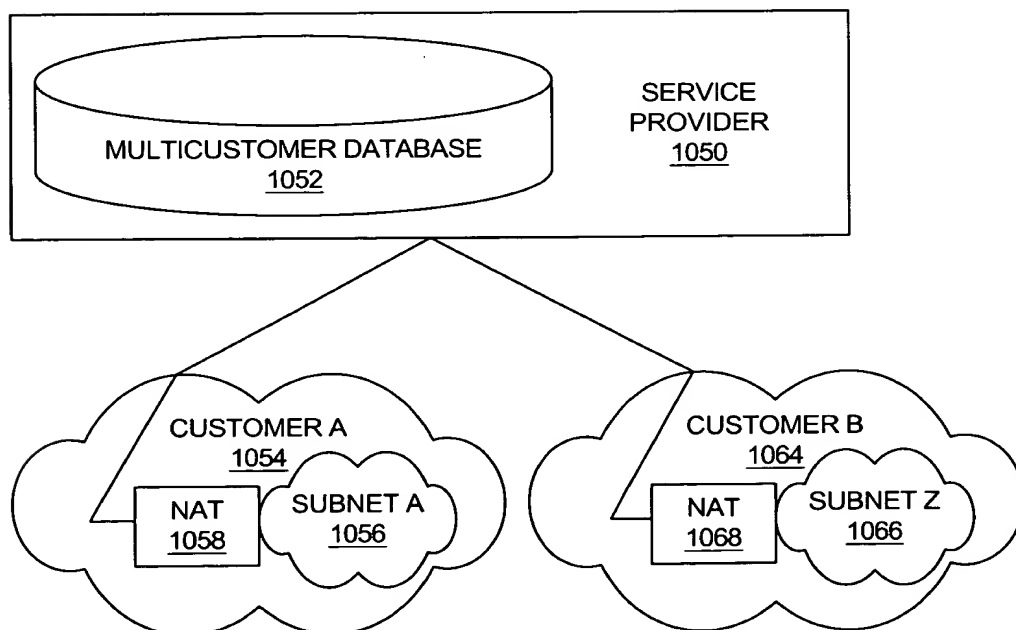


FIG. 10B

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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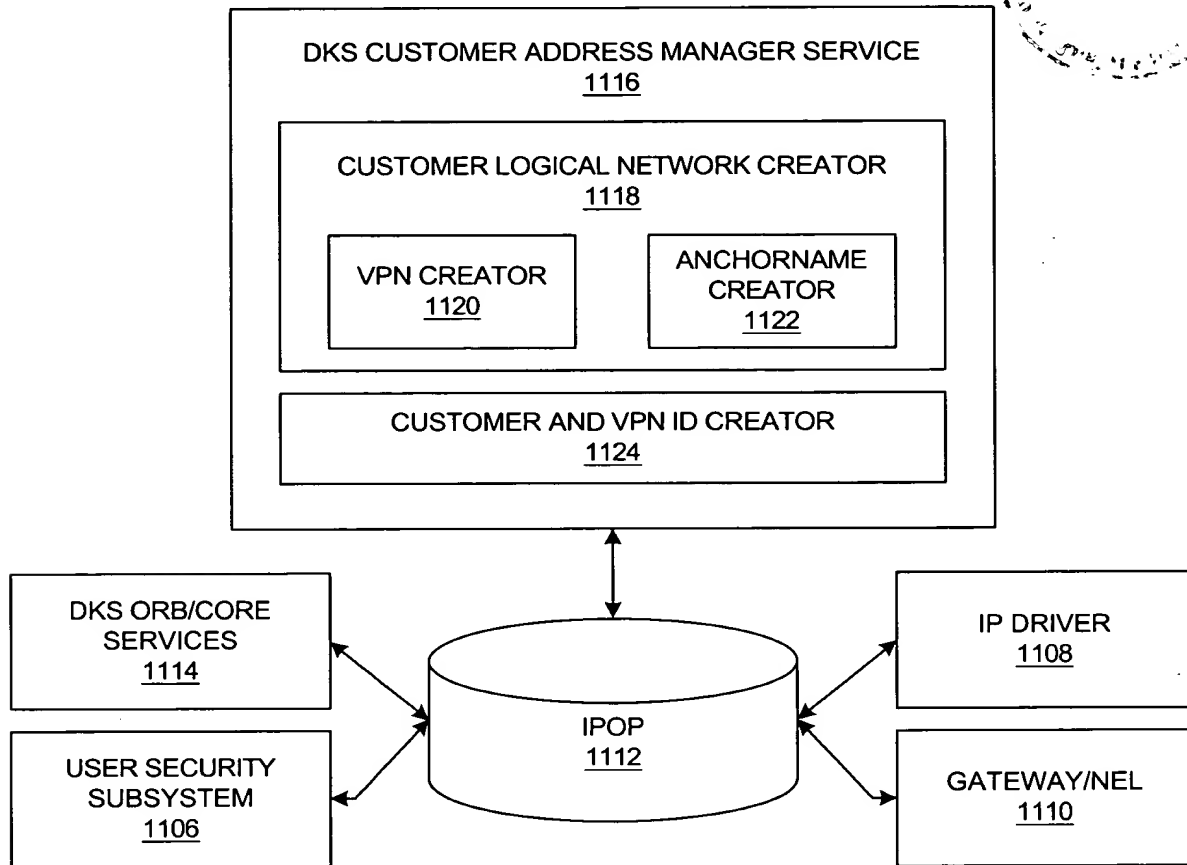


FIG. 11A

1350

Network Management Application

NETWORKS REQUIRING VPN CREATION-DUPLICATE ADDRESSES EXIST

PHYSICAL NETWORK ADDRESS: 10.7.205.103 ~ 1352

CUSTOMER ANCHORNAME: AUSTINBLDG1 ~ 1356

VPN ID: ~ 1370

PHYSICAL NETWORK ADDRESS: 10.7.205.103 ~ 1354

CUSTOMER ANCHORNAME: AUSTINBLDG2 ~ 1358

VPN ID: ~ 1372

1378 ~ ☒ CHANGE VPN ID FOR ENTIRE SCOPE

SET ~ 1374

1376 ~ CLEAR

FIG. 13

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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```

Public Class IPActionObject {

    Endpoint sourceEP;
    Endpoint targetEP;

    // CONSTRUCTOR
    IPActionObject( Endpoint targetEP, Endpoint sourceEP ) {
        .
        .
        .
    }
    VOID performAction( ) // EXECUTES ACTION METHOD
    .
    .
    .
}

```

FIG. 11B

```

Public Class Endpoint {

    // public variables
    long   EObjectID; // ID to object (both private and public network addresses)
    InetAddress EIPAddress; // physical network address (private or public)
    long   EPVPN; // virtual private network ID

    //get/set of variables
    public long      getObjectID( ) { ... }
    public InetAddress getPAddress( ) { ... }
    public long      getVPN( ) { ... }

}

```

FIG. 11C

```

Public Class EndpointCustomer extends Endpoint {

    public getVPNGW( ) {
        //gets the only gateway which has access to a particular private network
        .
        .
        .
    }
    //private variables only set/accessed by EP creator IPOP
    long   customerHashNumber;
    String customerName;
    String customerAnchorPath;
    Long   objectIDPrivateGatewayRoute

}

```

FIG. 11D

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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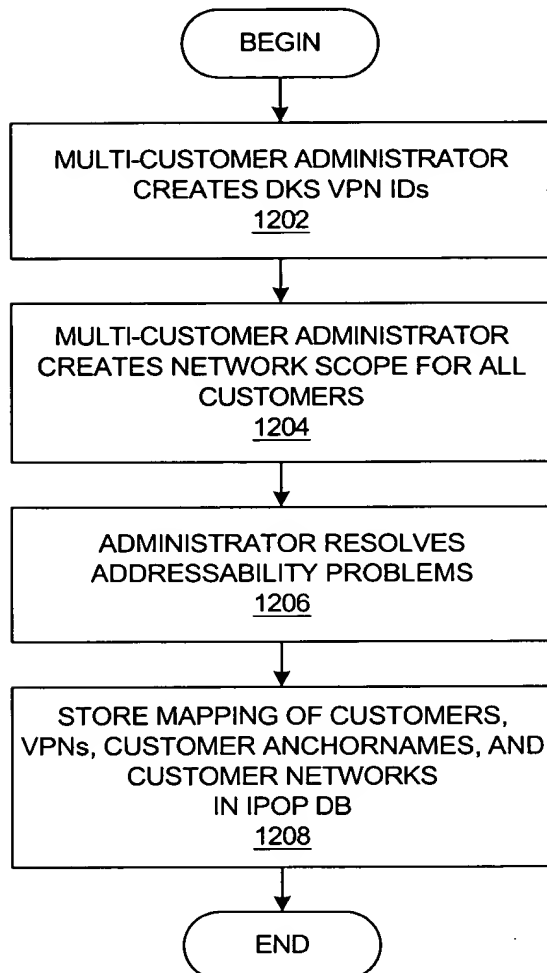


FIG. 12A

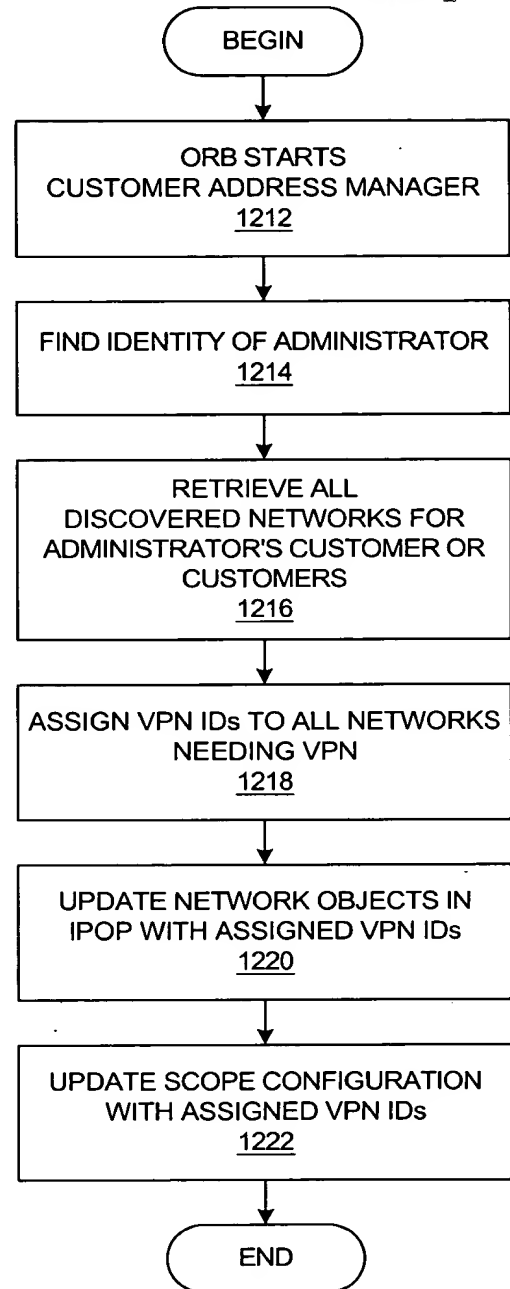


FIG. 12B

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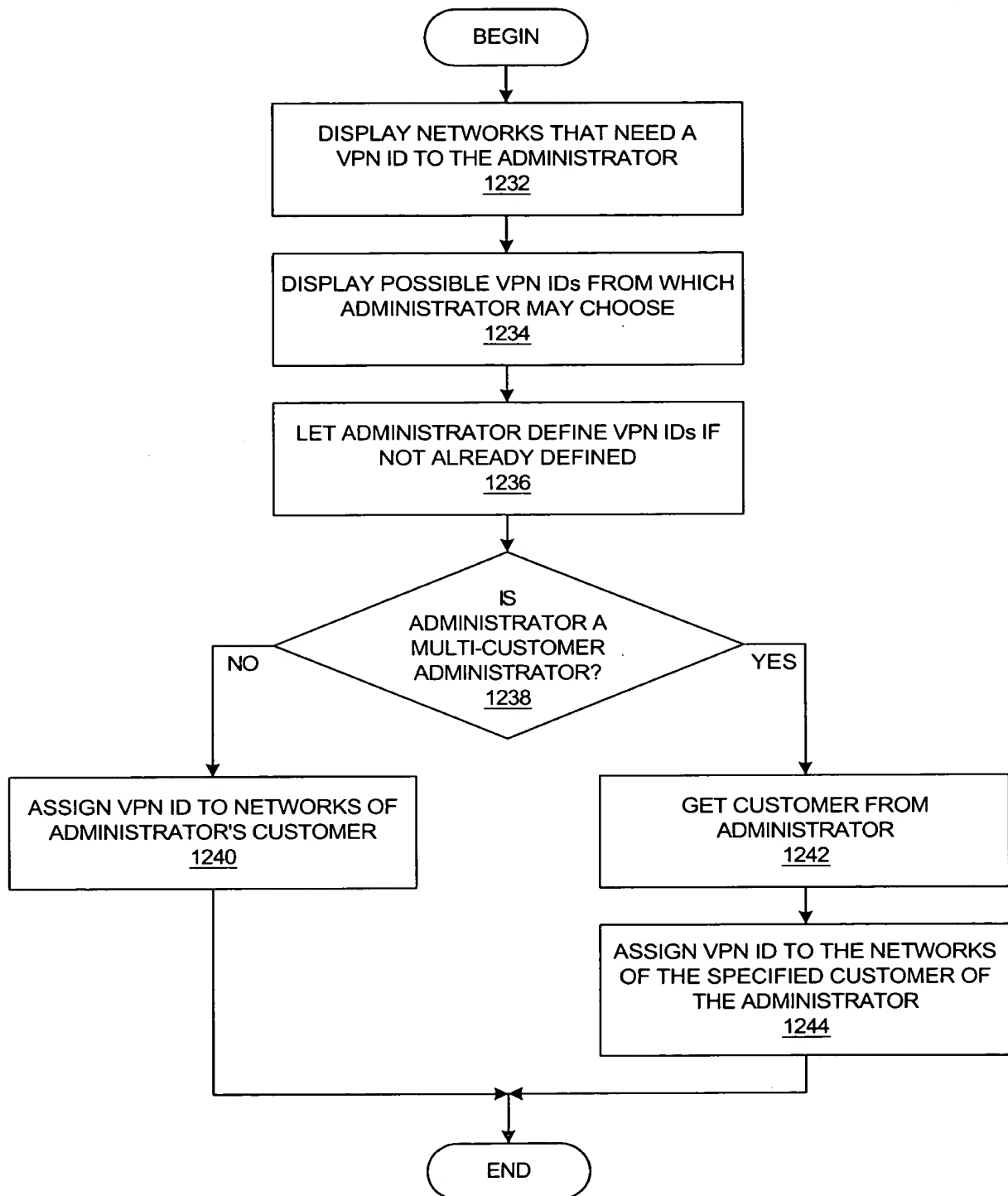
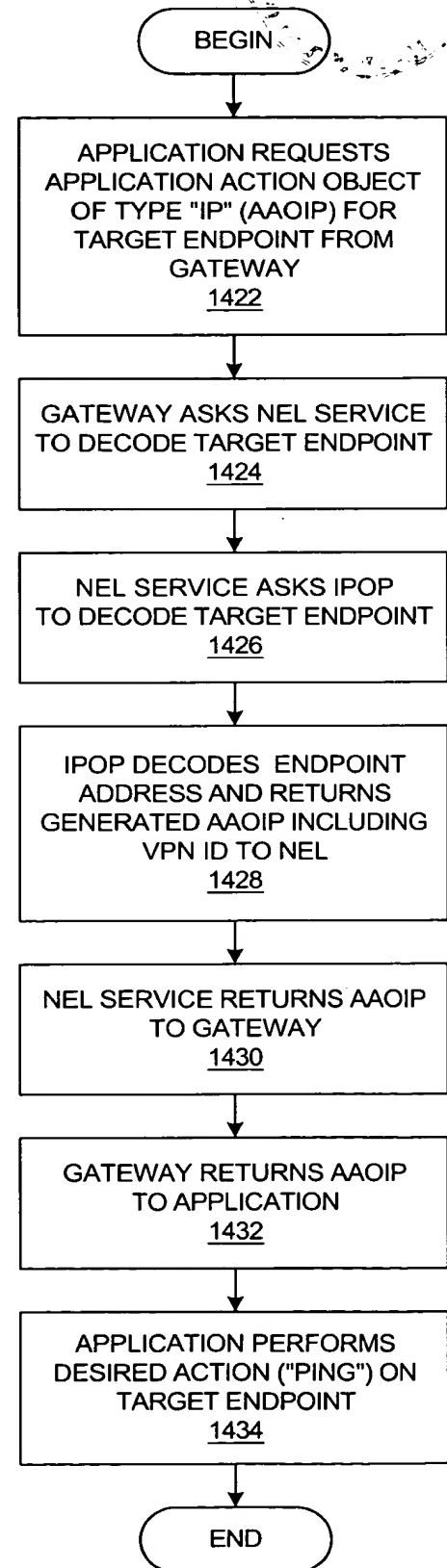
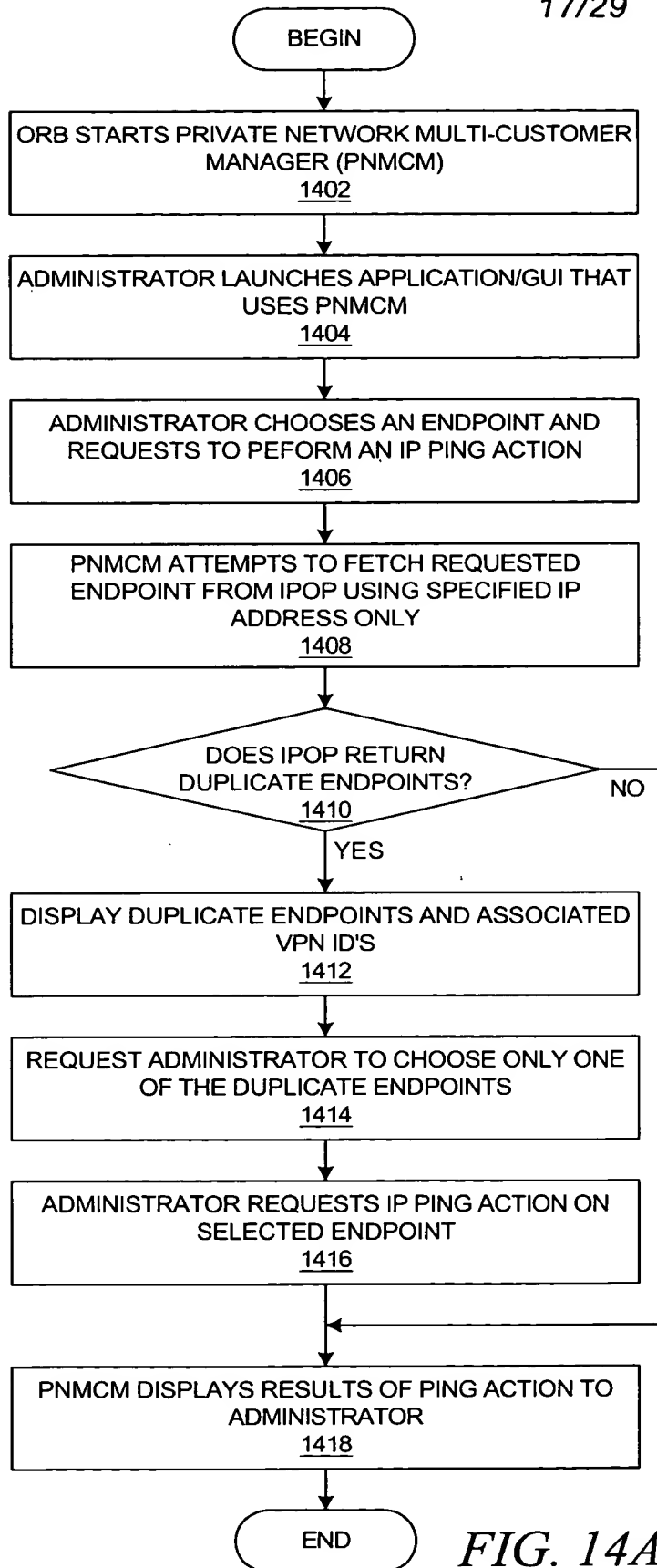


FIG. 12C

Method and system for presentation and specification of distributed multi-customer-
configuration management within a network management framework

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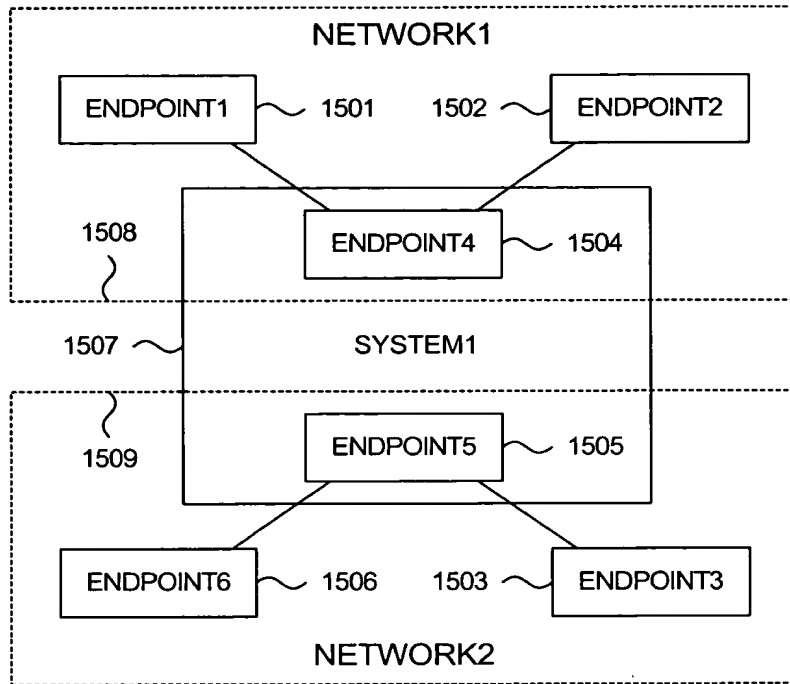


FIG. 15

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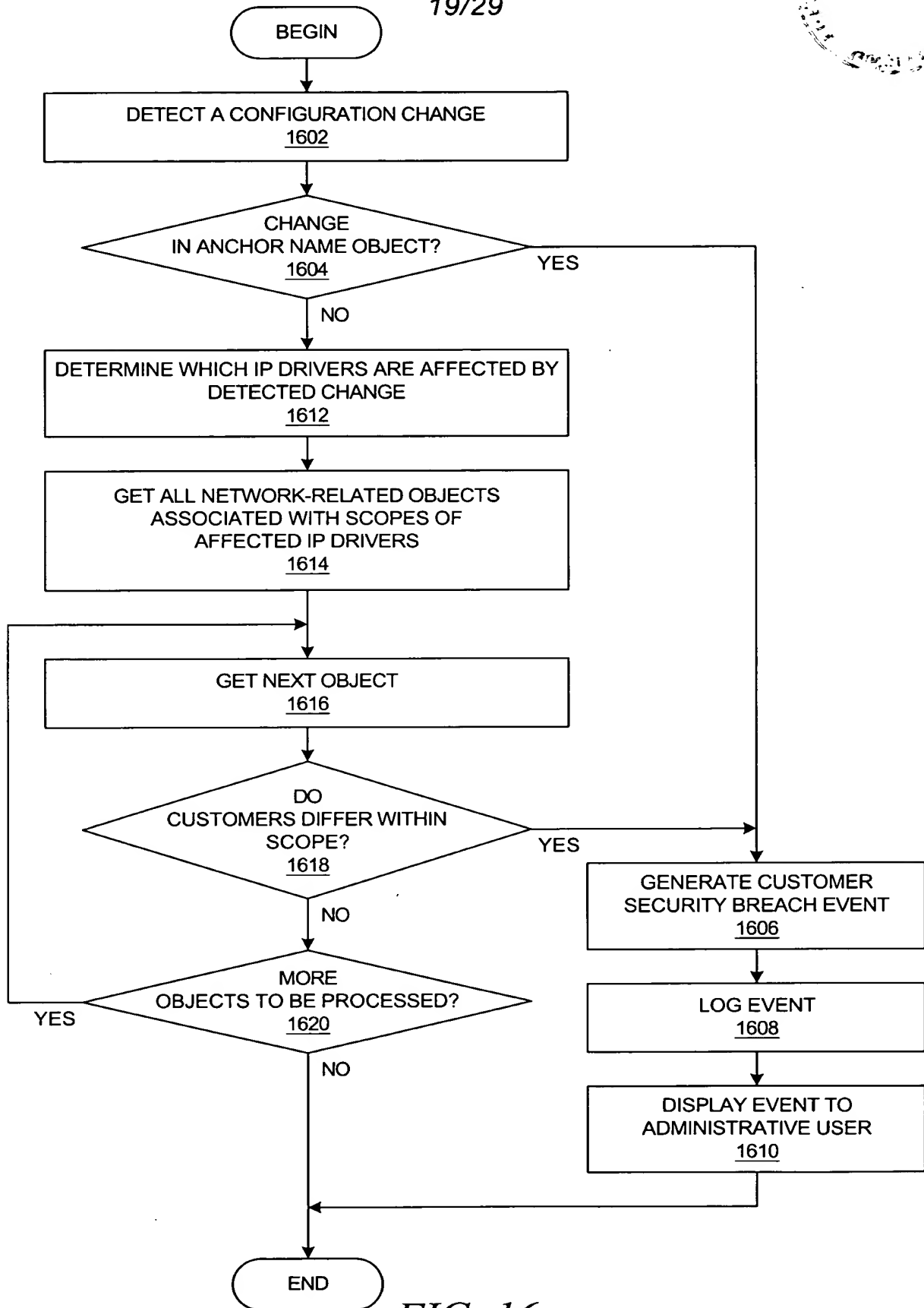


FIG. 16

Method and system for presentation and specification of distributed multi-customer configuration management within a network management framework

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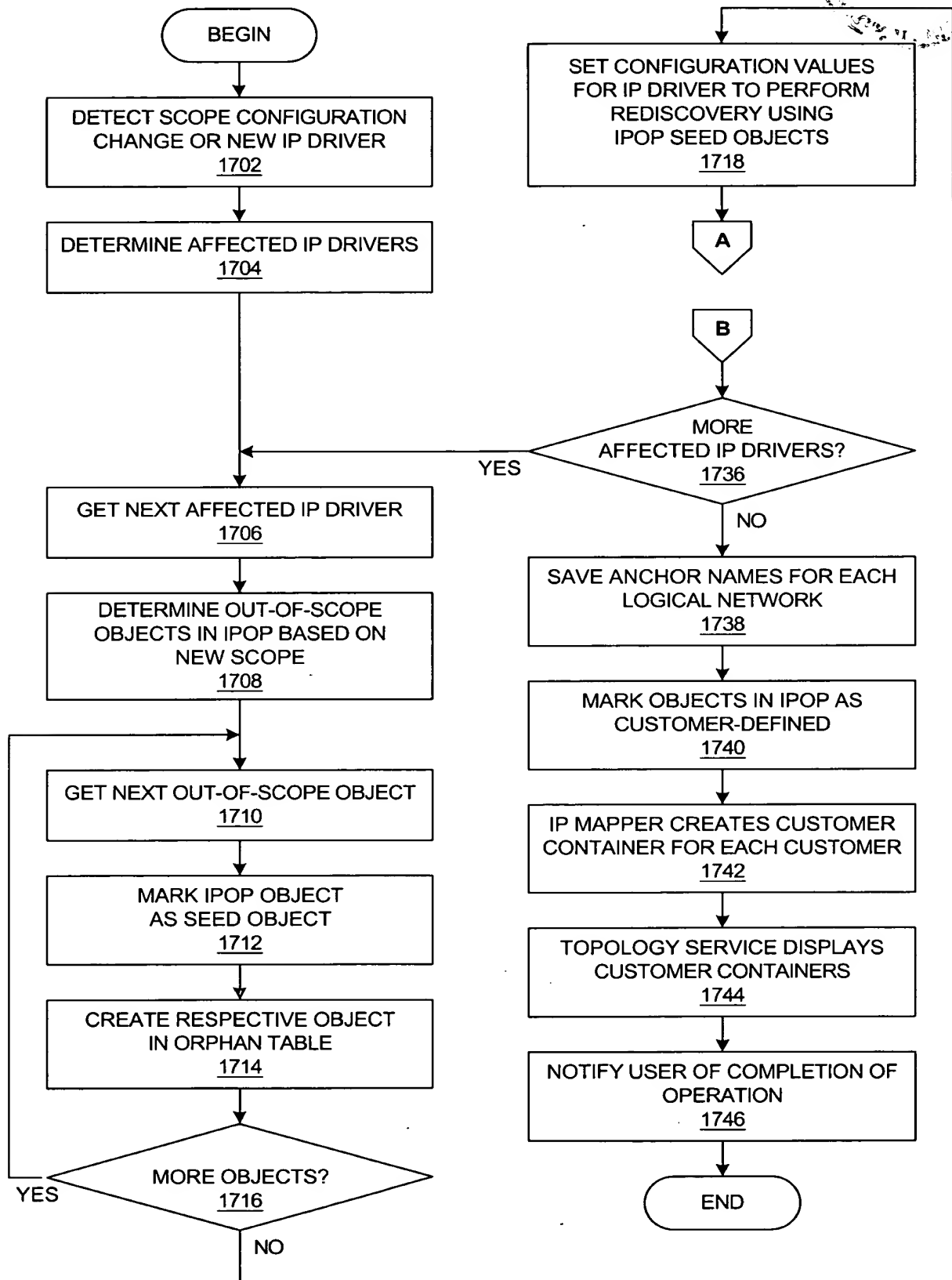


FIG. 17A

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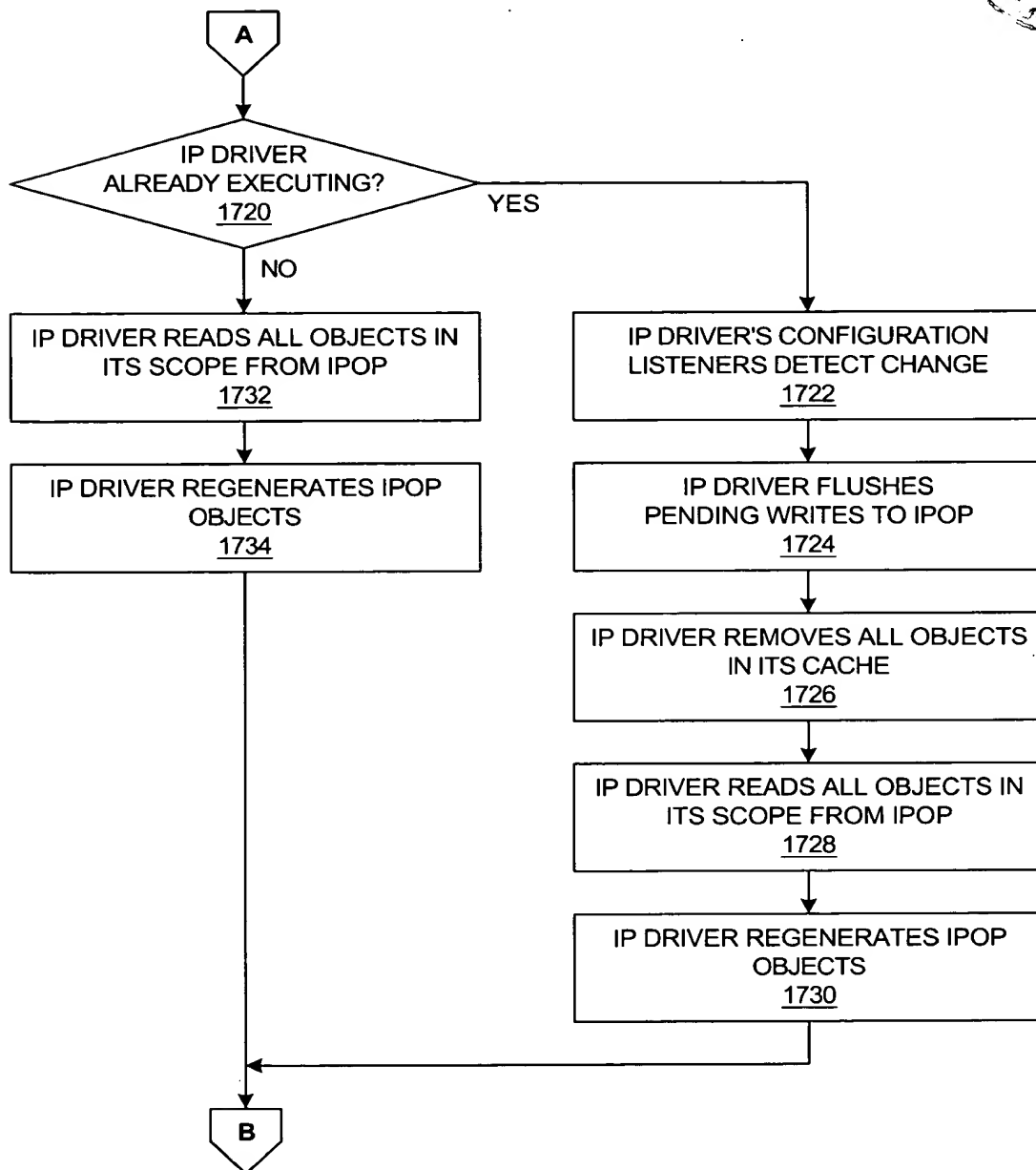


FIG. 17B

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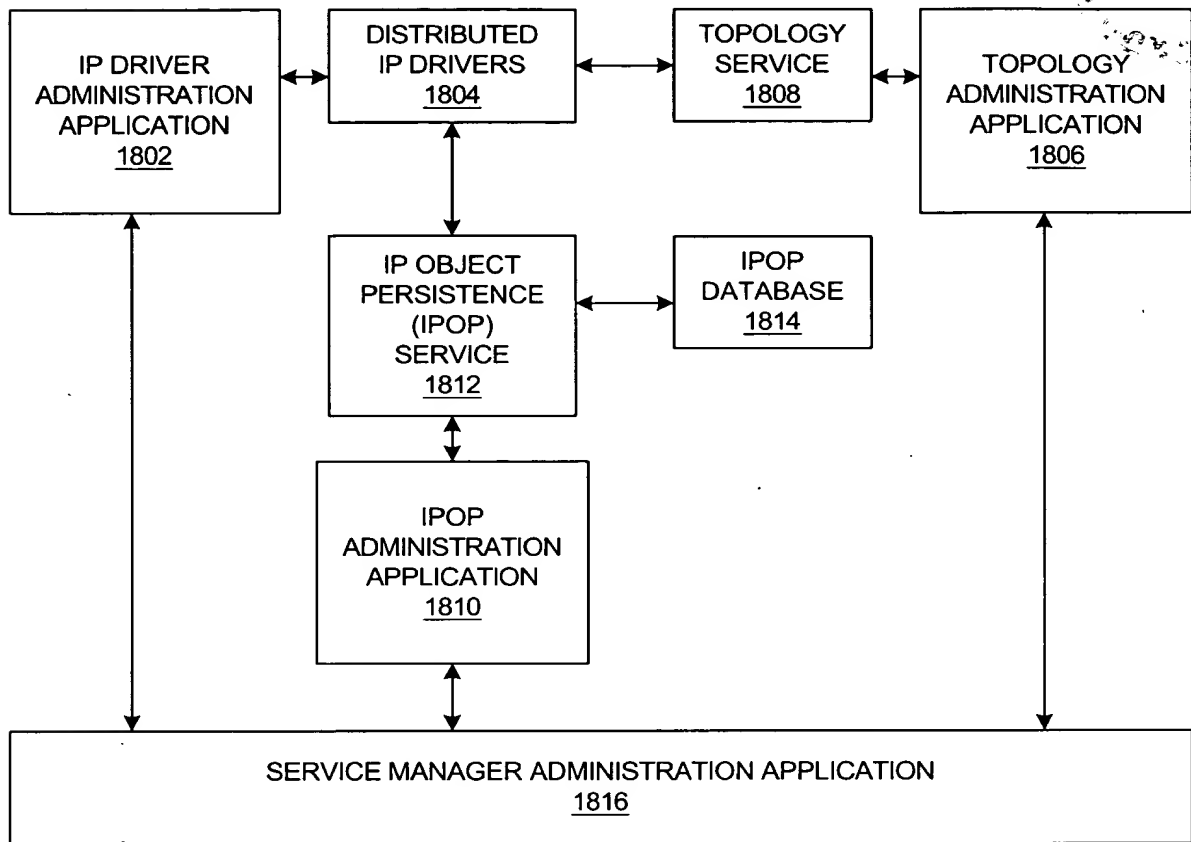


FIG. 18A

1820

Service Manager Administration Application

SERVICE LOCATION MANAGEMENT

ORB ID

START IP DRIVER ON: 1822

START NEL ON: 1824

START GATEWAY ON: 1826

START TOPOLOGY ON: 1828

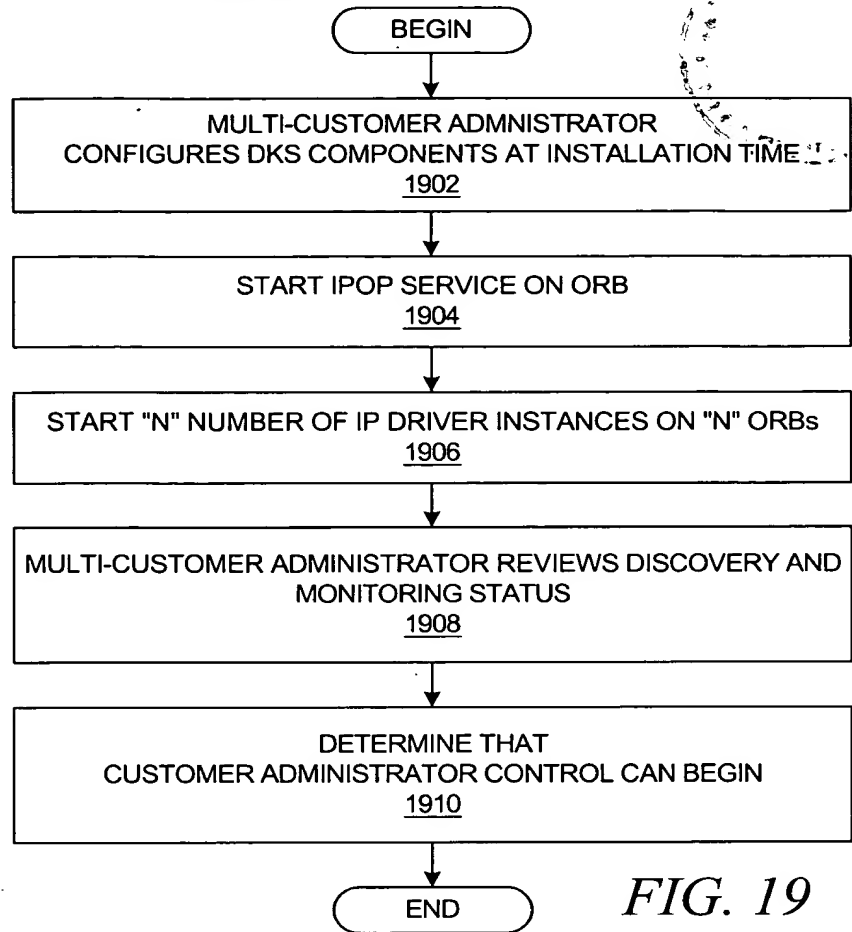
START IPOP ON: 1830

SET

CLEAR

FIG. 18B

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2000

IPOP Administration Application

IPOP DATABASE POOL

ALLOW TYPES OF CONNECTIONS

- ☒ NATIVE DATABASE DB2 ~ 2002
- ☒ NATIVE DATABASE ORACLE ~ 2004
- ☒ GENERIC DATABASE ACCESS ~ 2006

URL OF DATABASES: ~ 2012

IPOP TOTAL NUMBER OF ENDPOINTS DISCOVERED: 28193 ~ 2014

IPOP TOTAL NUMBER OF IP DRIVERS: 5 ~ 2016

USERID: ~ 2008

PASSWORD: ~ 2010

FIG. 20

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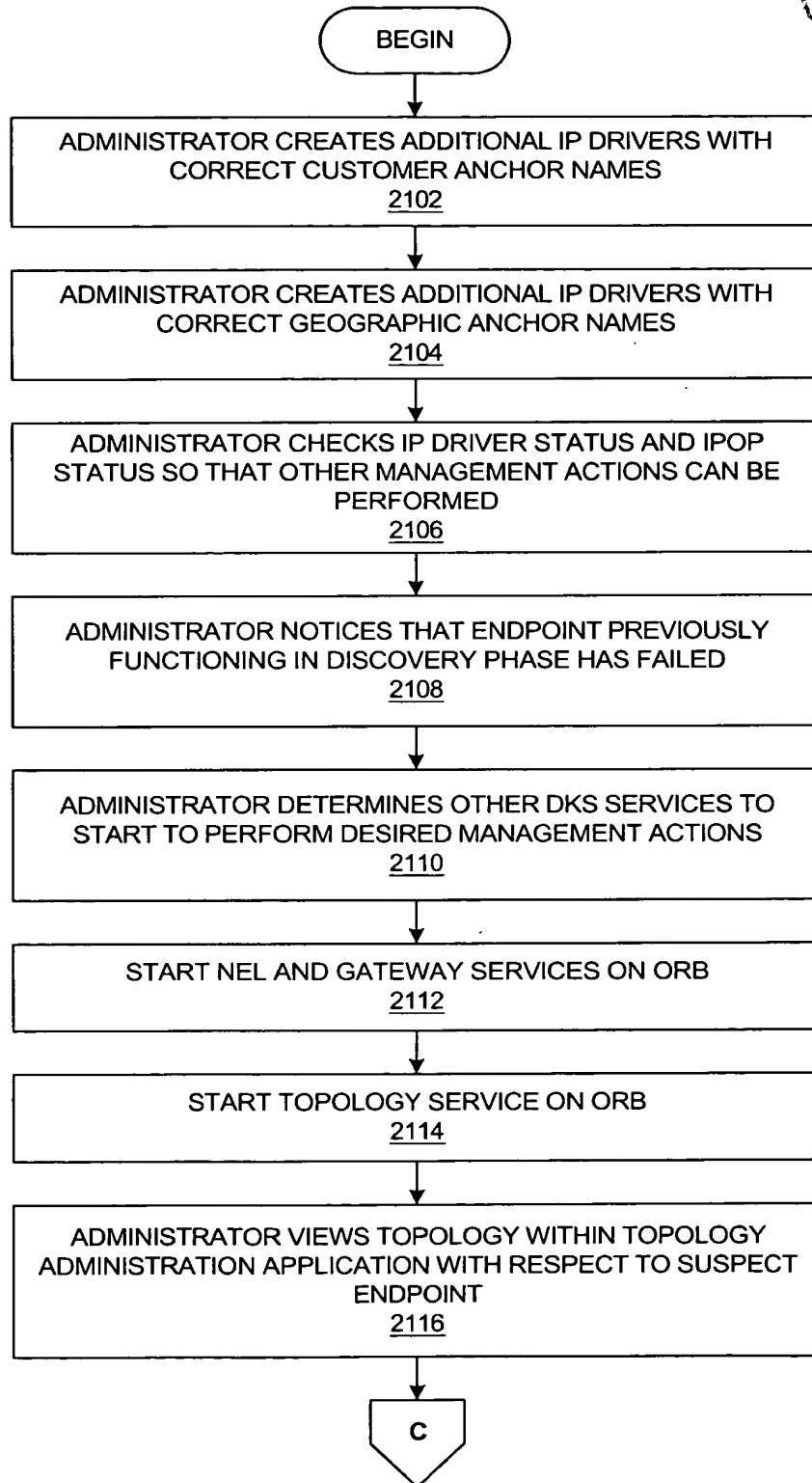


FIG. 21A

Method and system for presentation and specification of distributed multi-customer
configuration management within a network management framework

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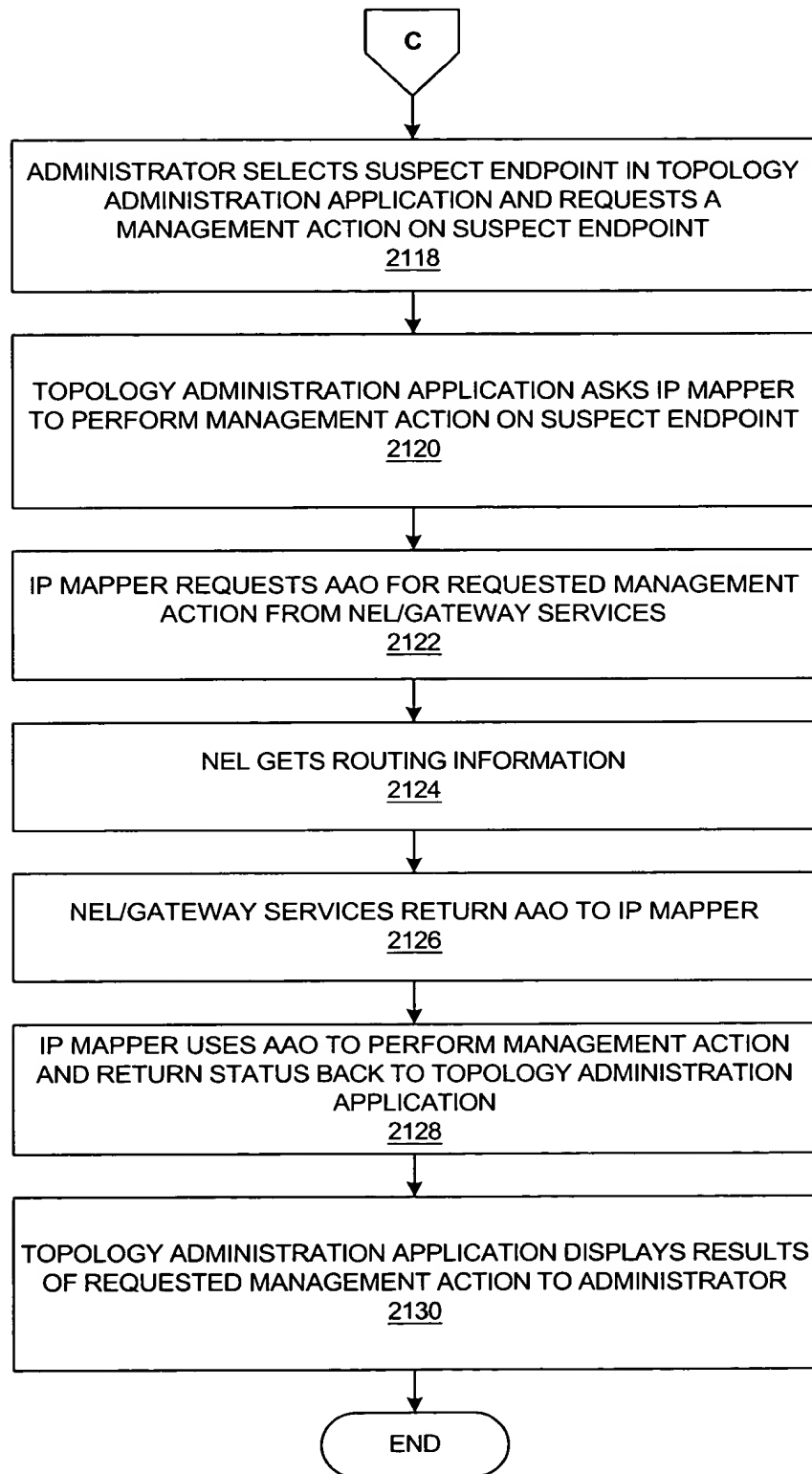
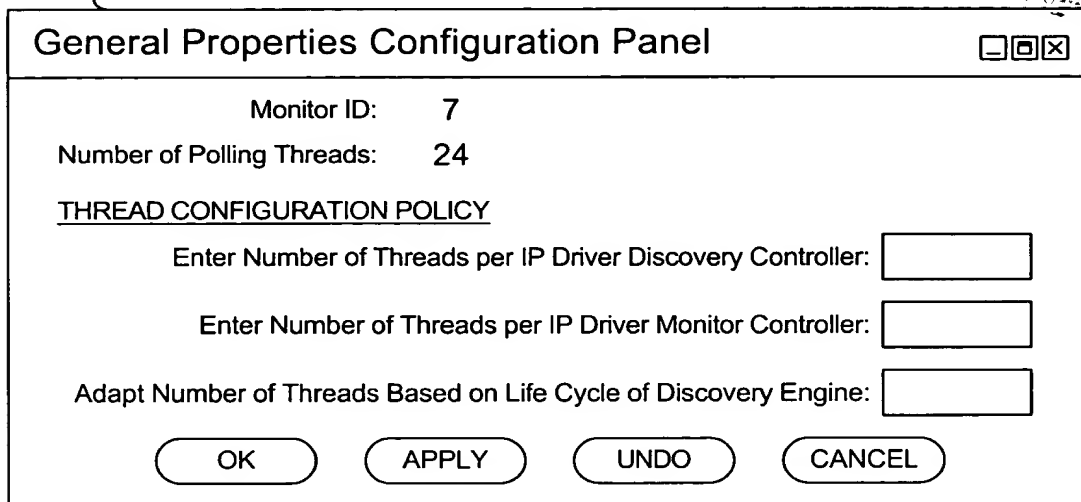


FIG. 21B

Method and system for presentation and specification of distributed multi-customer configuration management within a network management framework

2200

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General Properties Configuration Panel

Monitor ID: 7

Number of Polling Threads: 24

THREAD CONFIGURATION POLICY

Enter Number of Threads per IP Driver Discovery Controller:

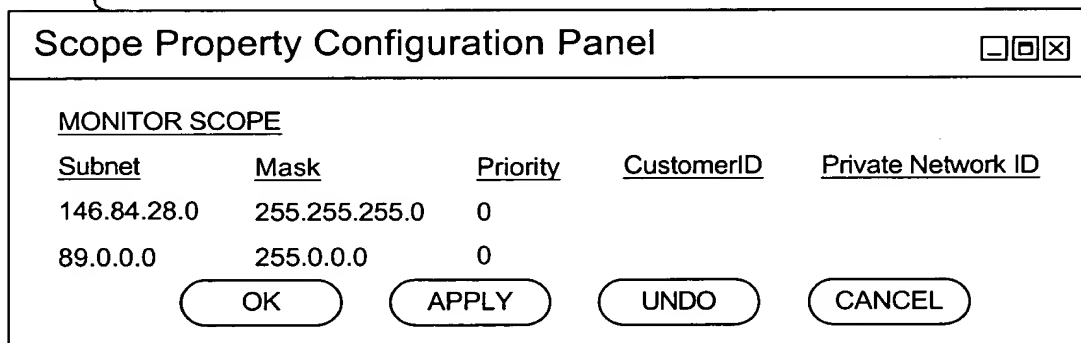
Enter Number of Threads per IP Driver Monitor Controller:

Adapt Number of Threads Based on Life Cycle of Discovery Engine:

OK APPLY UNDO CANCEL

FIG. 22

2300



Scope Property Configuration Panel

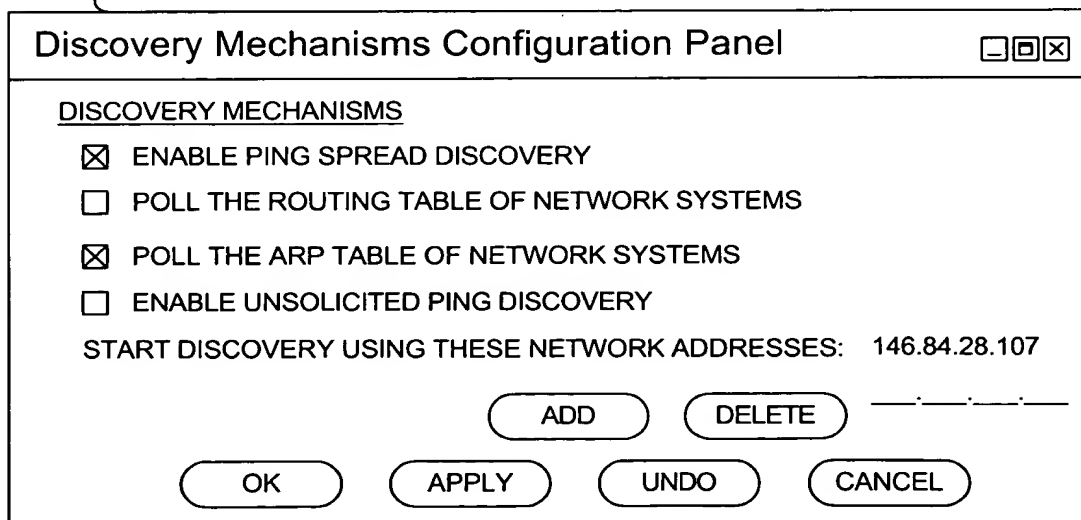
MONITOR SCOPE

<u>Subnet</u>	<u>Mask</u>	<u>Priority</u>	<u>CustomerID</u>	<u>Private Network ID</u>
146.84.28.0	255.255.255.0	0		
89.0.0.0	255.0.0.0	0		

OK APPLY UNDO CANCEL

FIG. 23

2400



Discovery Mechanisms Configuration Panel

DISCOVERY MECHANISMS

☒ ENABLE PING SPREAD DISCOVERY

☐ POLL THE ROUTING TABLE OF NETWORK SYSTEMS

☒ POLL THE ARP TABLE OF NETWORK SYSTEMS

☐ ENABLE UNSOLICITED PING DISCOVERY

START DISCOVERY USING THESE NETWORK ADDRESSES: 146.84.28.107

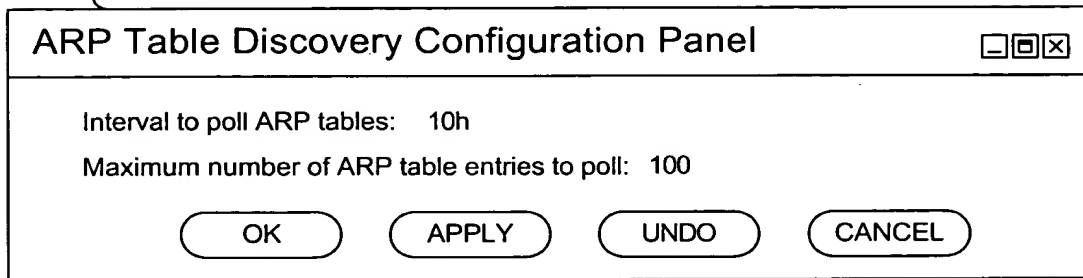
ADD DELETE

OK APPLY UNDO CANCEL

FIG. 24

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2500



ARP Table Discovery Configuration Panel

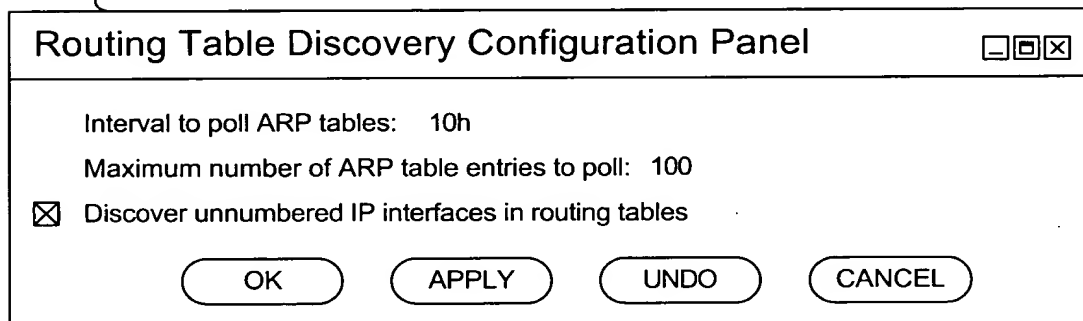
Interval to poll ARP tables: 10h

Maximum number of ARP table entries to poll: 100

OK APPLY UNDO CANCEL

FIG. 25

2600



Routing Table Discovery Configuration Panel

Interval to poll ARP tables: 10h

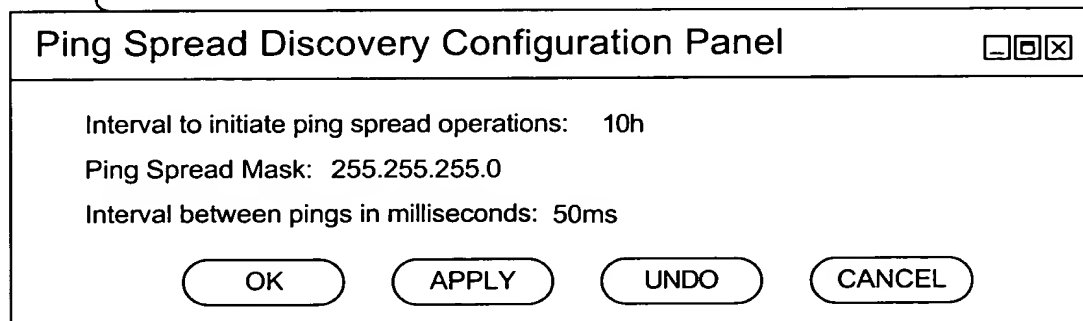
Maximum number of ARP table entries to poll: 100

☒ Discover unnumbered IP interfaces in routing tables

OK APPLY UNDO CANCEL

FIG. 26

2700



Ping Spread Discovery Configuration Panel

Interval to initiate ping spread operations: 10h

Ping Spread Mask: 255.255.255.0

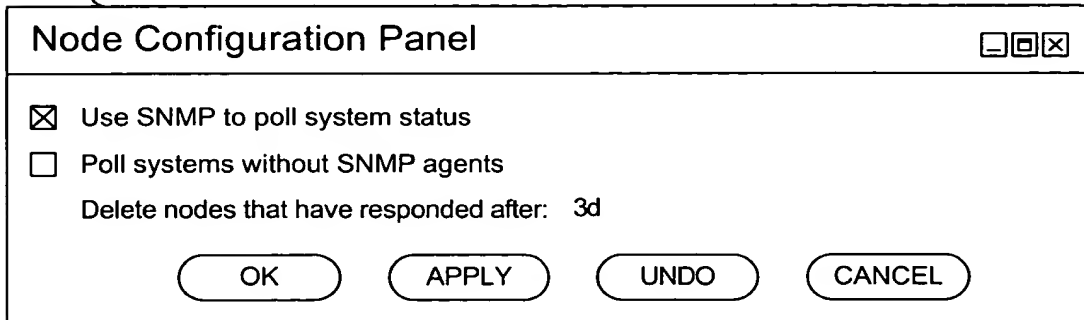
Interval between pings in milliseconds: 50ms

OK APPLY UNDO CANCEL

FIG. 27

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2800



Node Configuration Panel

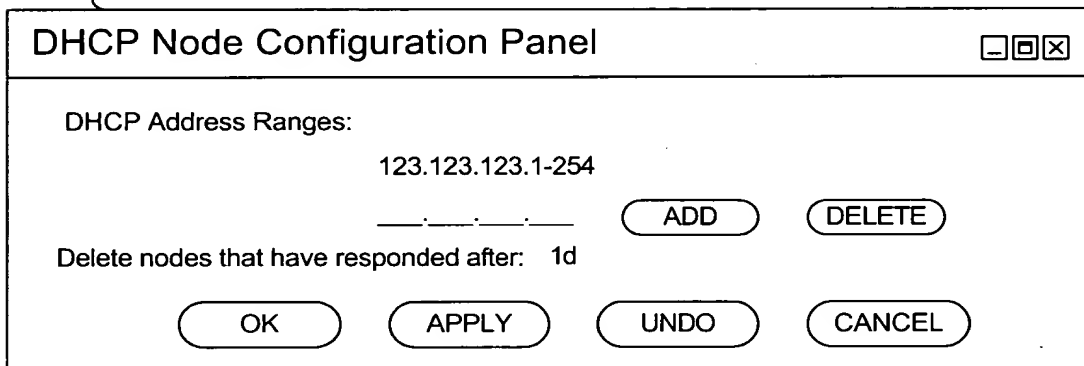
☒ Use SNMP to poll system status
☐ Poll systems without SNMP agents

Delete nodes that have responded after: 3d

OK APPLY UNDO CANCEL

FIG. 28

2900



DHCP Node Configuration Panel

DHCP Address Ranges:
123.123.123.1-254

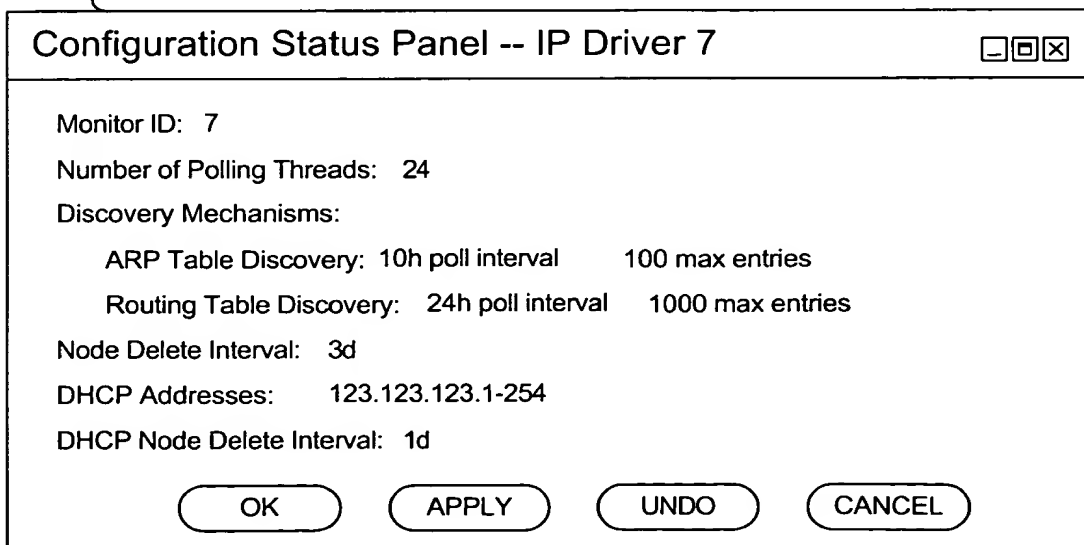
ADD DELETE

Delete nodes that have responded after: 1d

OK APPLY UNDO CANCEL

FIG. 29

3000



Configuration Status Panel -- IP Driver 7

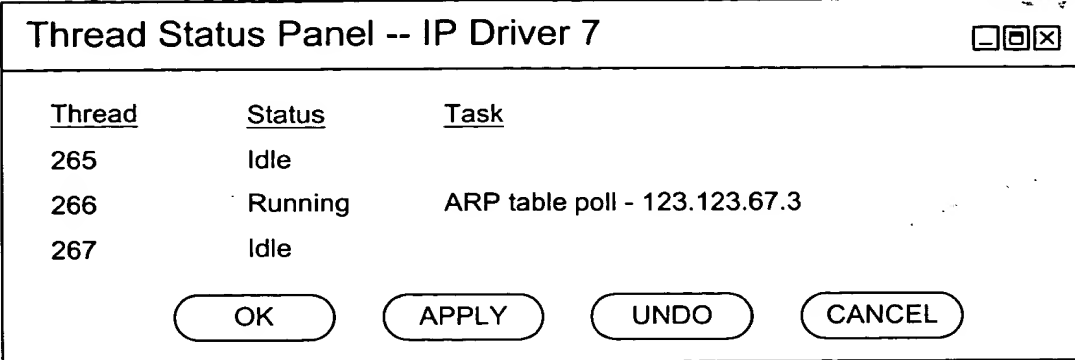
Monitor ID: 7
Number of Polling Threads: 24
Discovery Mechanisms:
ARP Table Discovery: 10h poll interval 100 max entries
Routing Table Discovery: 24h poll interval 1000 max entries
Node Delete Interval: 3d
DHCP Addresses: 123.123.123.1-254
DHCP Node Delete Interval: 1d

OK APPLY UNDO CANCEL

FIG. 30

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3100



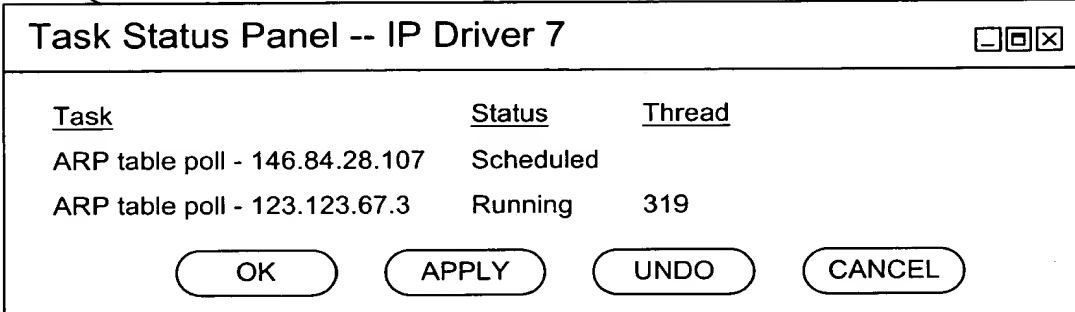
Thread Status Panel -- IP Driver 7

<u>Thread</u>	<u>Status</u>	<u>Task</u>
265	Idle	
266	Running	ARP table poll - 123.123.67.3
267	Idle	

OK APPLY UNDO CANCEL

FIG. 31

3200



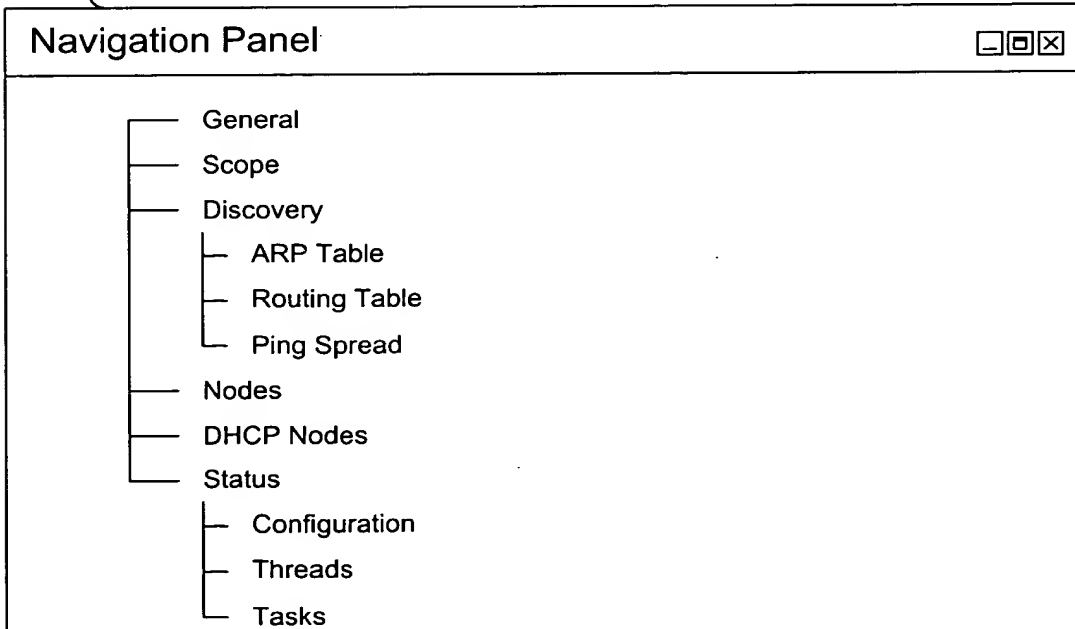
Task Status Panel -- IP Driver 7

<u>Task</u>	<u>Status</u>	<u>Thread</u>
ARP table poll - 146.84.28.107	Scheduled	
ARP table poll - 123.123.67.3	Running	319

OK APPLY UNDO CANCEL

FIG. 32

3300



Navigation Panel

- General
- Scope
- Discovery
 - ARP Table
 - Routing Table
 - Ping Spread
- Nodes
- DHCP Nodes
- Status
 - Configuration
 - Threads
 - Tasks

FIG. 33